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ABSTRACT

The short-term impacts of public community colleges upon the business and government sectors of Maryland's economy were measured through a series of linear cash-flow formulas. In 1976-77, total direct and indirect expenditures attributable to the 17 colleges in areas of salaries, purchase of materials, and capital building improvements were almost $124 million. In addition, the state received about $9 million from taxes paid by the faculty and staff, from the federal government, and from taxes on business property allocable to college transactions. About 6,700 jobs were also available because of the colleges. Human capital studies of the long-term impacts of the colleges on students and the state reveal that, on an average, community college students in Maryland will receive almost a 27% return on their investments in higher education during their lifetimes. Social economic gains, in return for the costs of education to students and the public, were measured in terms of increased productivity; this average rate of return was about 15%. The study report includes a bibliography, appendices which outline multiplier effects, gravity theory, and business volume, and a literature review. (Author/AYC)

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ECONOMIC IMPACTS OF MARYLAND COMMUNITY COLLEGES:

A CLOSER LOOK

Dorothy S. Linthicum
September 1978

The Jeffrey Building
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JC 780 533

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Dorothy S. Linthicum

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PREFACE

In September 1977, Dorothy Linthicum, a graduate student at the University of Maryland, joined the State Board for Community Colleges staff as an intern to conduct the first comprehensive Statewide analysis of the costs and benefits of Maryland's community colleges. This document represents a summary of the culmination of her efforts.

In addition to the Statewide data described in this report, individual impact studies were compiled for each of the seventeen public community colleges in Maryland. A technical manual which contains instructions for updating information, adding survey data, and using the computer models developed for this study has been made available to the colleges. Further, a document, available from the State Board for Community Colleges, has been widely distributed.

This study could not have been completed without the cooperation of many people at the colleges, especially the institutional researchers and the business officers. Their time and efforts are gratefully acknowledged. The State Board for Community Colleges was able to conduct this cost-benefit analysis through a grant from the Maryland State Department of Education, Division of Vocational-Technical Education. The help of two State Board staff members, James D. Tschechtelin for theoretical and technical assistance and Maxine J. Pope for manuscript preparation, was also instrumental in completing the report.

Finally, the State Board for Community Colleges appreciates the efforts of Ms. Linthicum who completed this complex project on time with existing data, in a highly professional manner.

Brent M. Johnson
Executive Director

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ABSTRACT

Community college advocates for a long time have alluded to the benefits of a college to students and the community. The economic side of those benefits has been mentioned, but up to now quantitative information has not been available. This study measures the short-term impacts of public community colleges in Maryland through a series of cash-flow formulas and the long-term impacts to students and the State through human capital theory.

Total direct and indirect expenditures attributable to the seventeen colleges in 1976-77 were almost $124 million. In addition, the State received about $9 million from taxes paid by the faculty and staff, from the federal government, and from taxes on business property allocable to college transactions. About 6,700 jobs were also available because of the colleges.

In the human capital portion of the study, average community college students in Maryland were estimated to receive almost a 27 percent return on their investments in higher education during their lifetimes. The average rate of return for the social investment was about 15 percent. At the present, investments in community college education in Maryland appear to be sound for students, communities, and the State.

INTRODUCTION

The community college segment in Maryland has offered unprecedented access to higher education. By lowering the cost of higher education to students and providing easy geographic access, the community colleges have opened the door to higher education to many citizens who otherwise would not have been able to obtain any college education.

The community colleges have provided many benefits to the people of Maryland, not only in terms of the value of the education provided to the students, but also in the diversity of the institutions themselves. These benefits and their associated costs have been identified in general terms, but no one has ever assigned numerical values to them. The quantification of these benefits and their associated costs could be a useful tool in making decisions about the future direction and priorities of the community college system. The problem addressed in this study is the identification of those economic benefits and costs generated by Maryland's community colleges.

What is cost-benefit analysis?

Cost-benefit analysis is a technique for making decisions within a framework that has a wide range of considerations, including those which are political or social. In simple terms, it is a way of comparing all costs with all benefits. As a formal technique, cost-benefit analysis in the United States dates back to the early part of the 19th century. Since then techniques have improved, and cost-benefit analysis has spread to many fields.

Because cost-benefit analysis is derived from the field of economics, many equate the process with numbers, dollars, and cents. While a cost-benefit study can be just as useful in measuring such noneconomic factors as the social-cultural benefits a community college provides its students, this study will examine only the economic costs and benefits--in other words, the numbers, dollars, and cents.

PURPOSE

Why look at economic costs and benefits?

Taxpayers and their legislative representatives at all levels are seeking evidence to justify the investment made in public community colleges. Part of the rationale for continued support comes from the belief in equalization of opportunity. Many people from different socioeconomic levels, with varying degrees of ability and of all ages, are obtaining a higher education through the community colleges. Another part of the rationale stems from the expectation of increased economic benefits to both the individuals and society as a whole.

The economic benefits can be explained according to the varying kinds of impacts. First and foremost is the investment aspect of education. As a result of community college education, both employees and their employers can expect increased productivity and income.

A corollary to the higher incomes that college educated persons generally command is the increased taxes they also pay. These taxes assist in repaying the public for its investment in the community college education.

Finally, the operation of community colleges results directly in more immediate community benefits by providing increased jobs through expenditure of funds, and indirectly as a result of the multiplier effects of spent income.

Associated with these benefits are costs. These costs include not only the capital and operating costs of the community college program but also the opportunity costs associated with the student's foregone income, tax receipts, and production. Income is foregone because, obviously, a person cannot be at work while he is in class. Similarly, payroll taxes are not deducted when a person is not on payroll, and production is lost. This is true of the traditional college student who attends college full-time. To the extent that community college students increasingly attend part-time while employed, income is less likely to be foregone with consequently less loss in payroll taxes and production. The lost property tax receipts for college property which is removed from the tax rolls also must be considered. While not all of these costs are related to each benefit, they must be considered when appropriate in the calculation of costs and benefits.

How can economic costs and benefits be measured in education?

Economic impacts of community colleges can be examined in two ways. In a short-term approach the expendiutres of certain dollars are traced throughout a certain region during a short time span, usually one year. A long-term approach considers impacts of investments over a long period of time.

Just as businesses invest in additional capital, e.g., equipment and new buildings, to expand their earnings, individuals and society can invest in education to expand earnings and increase productivity. By paying some costs in the present, they can generate greater returns in the future. This kind of long-term investment is often called human capital investment.

Comparisons of future earnings and the investments made by community college students and the people of Maryland describe which investments are most lucrative. Those factors which are most critical in decreasing or increasing expected returns also are identified. What is the difference, for example, between the student who works part-time, and the one who is unemployed? The State and local jurisdictions can also get an idea of how much additional tax revenue will be generated, and to what extent their investments will be repaid.

The human capital approach is a method of viewing long-range economic impacts. A short-term impact study examines the immediate effects of the income and expenditures of the colleges on the economy of Maryland and the local jurisdictions. Funds enter the economy through the colleges from State and local appropriations, from out-of-state sources, and from student fees and tuition. The funds are circulated through the economy by expenditures of the college for salaries, purchase of materials, and capital building improvements. The impact study can be useful in showing the State and local jurisdictions the ways and extent to which community colleges contribute to the economic base. In addition, impact information can reveal to the colleges how certain of their activities, which were thought to be purely internal matters, affect the community in direct and measurable ways.

How can the numbers be used?

Cost-benefit analysis can cause officials and citizens to look at problems in different ways and help to raise important questions. This study can improve community and college relations by revealing the interrelationships the area and college share. Public officials can be made more aware of the tax costs and tax revenue benefits that the college generates. Faculty and staff can be made more aware of their immediate contribution to the community and State. Finally, State officials and the citizens of Maryland can see that the outlay of funds in support of community colleges does not disappear but rather supports the State's economy. Neither position adequately portrays the true circumstances unless the two are considered together in light of the actual facts. This study provides some of the facts.

Citizens often only view the community college as a cost to be borne. Educators, on the other hand, are inclined to dwell on economic, cultural, and recreation contributions and the visibility an institution brings a community.

LIMITATIONS

What don't the numbers show?

Colleges are not banks; they do not propose to make money for investors. They do try to enlarge a student's world by introducing new people, new activities, and new ideas. Careful addition, in short, allows the determination of the costs of a community college education, but even the most accurate estimates and projections of economic impact, salaries, fringe benefits, and employment levels cannot reveal its total value.

There are several technical limitations which also should be recognized. For example, in using a multiplier effect to measure the expansion of the initial investment from cycles of respending, it is assumed that the money would not have been spent otherwise. This can be argued readily at the local level but is questionable at the State level. Multiplier effects are generated only by spending that does not withdraw resources from alternative uses in the area. If no community colleges existed, it could be argued that the money would have been spent on the other segments of higher education or by consumers who would be paying less taxes. This study, however, which attempts to estimate as closely as possible the total impact of community college spending in Maryland, will use a multiplier effect. The assumption is made that money spent in support of community colleges would not have otherwise been spent in Maryland. For comparison, estimates not including the multiplier effect are included.

It should also be noted that this study makes use of existing data from the State Board for Community Colleges and the seventeen Maryland community colleges; from federal, State, and local agencies; and the literature in general. Because no new data were compiled, estimates based on similar studies, aggregate data, and judgment were necessary. However, actual figures for most of the critical information were available. Some error also might have been introduced in the attempt to represent all values in 1976 dollars. For example, the Census of Manufacturing, which was used to assess the economic base of the State and local subdivisions, is taken every five years. Because the 1972 version, which was published in 1976, was used, it was necessary to estimate the growth between 1972 and 1976.

One other word of caution should be mentioned. There is no way to add all benefits in a credit column and all costs in a debit column to come out with one neat answer. First of all, some expenditures and costs would be listed more than once. Secondly, the impact analysis computes both stock and flow figures. These are economic terms which refer to spending on items which are quickly consumed (flow), and spending on items that have a longer life span (stock). Theoretically, these cannot be added to, or subtracted from, one another. A third related point deals with the use of human capital and impact analysis in one study. Like the stock goods, human capital studies deal with long-term investments. The results reflect increased earnings or taxes over a lifetime. The impact analysis is comparable to flow goods because an assessment of the expenditure impacts is made only for the 1977 fiscal year.

Cost-benefit analysis does not pretend to be a perfect technique. Although economic analysis has many imperfections, it can be an effective tool. "The difficulties are not created by cost-benefit analysis. Moreover, they do not render quantitative analysis useless. They simply mean that one has to be discriminating about when and how to use various tools." [22]

SUMMARY REVIEW OF THE LITERATURE

HUMAN CAPITAL INVESTMENT

Intensive interest in the proposition that education is an investment in human beings originated with Theodore Schultz in 1960. Since then, establishing the specifics of a causal relationship between education and income has continued to dominate the writing in human capital investment. Kastner [20] notes that research no longer is directed toward the validity of the human capital concept, but is now concerned with determining its value.

The approach most used in human capital research contrasts the future lifetime earnings of people of less education with people of greater educational attainment. Alexander [1] believes that this rate-of-return method is the most precise because it relates not only benefits but also costs. Becker's [3] classic study, for example, showed a very substantial private gain to white male college graduates as compared to high school graduates.

To calculate a rate of return, it is necessary to know how much an education costs, how much the college-educated earn compared to those without a college education, and how much those future earnings are worth today. [2]

The costs of education include direct expenditures for salaries, supplies, etc., and indirect or opportunity costs that take the form of foregone student income or foregone tax revenues. [45] There has been some controversy about including foregone income as a cost component. Schultz, Cohn, Blaug, and others feel that it should be included and that a downward bias in costs will be created if it is excluded. [34, 8, 5,] Becker claims the dominance of foregone earnings and the relative unimportance of tuition can be vividly demonstrated with rate of return calculations. [3]

The economic value of education is distorted by factors, such as intelligence, parents' education, sex, and race. The degree to which education contributes to higher economic returns is often disputed. Raymond and Sesnowitz [33] contend the income differences between educational categories are likely to be overstated since those with more income are more apt to have greater ability. Much work has been done recently in an attempt to separate the effects of education and ability on earnings, but no clear consensus has been reached. Becker, however, points out that economists have been aware that conventional measures of ability, while relevant at times, do not reliably measure the talents required to succeed in the economic sphere. [3] Hause [16] also feels that adding an ability bias has been somewhat misdirected. Others have consistently corrected final earning differentials by 15 to 33 percent to account for ability differentials. [15, 33, 3, 45] In a study designed to determine the ability factor, Weisbrod and Karpoff [46] estimated that about one fourth of the difference between the mean earnings of college graduates and the mean earnings of high school graduates as shown by Census data is due to noneducational variables.

Long payoff periods also affect the rate of return on a college education. Becker notes that the length of the payoff period increases the difficulty of anticipating a gain from college. While business investments often pay off within five or ten years, the payoff from college takes much longer. [3] This affects the determination of an appropriate discount rate. Selected discount rates used to compute lifetime earnings were usually 3 to 5 percent. [15] Internal rates of return, or computed discount rates of community college students, ranged from 16.8 percent for white males with no ability adjustment [33] to 2.2 percent for nonwhite males. [17] Kastner found the direct returns to individuals who acquire a community college education represent an annually compounded interest or discount rate of at least 5.6 percent for males and 5.88 percent for females. [20]

Another factor affecting the time span is the normal growth of the economy. Studies show that some allowance for growth rates is probably in order for cross-sectional studies, which measure earnings at one point in time as opposed to cohort studies which trace a group's earnings over a period of time. A 3.5 percent increase per year seems to be an accepted rate. [33]

Becker also suggests that data should be corrected for mortality [3], but Raymond and Sesnowitz argue that it has virtually no impact on the rates of return. [33]

The social economic gain from education, the gain to society as opposed to individuals, differs from the private gain in costs and benefits. Direct costs are obviously greater to society than to students because some of the expenditures of students are paid out of public and private subsidies. Raymond and Sesnowitz show that in all cases the social rates fall short of the corresponding private rates. [33]

Another way of looking at social benefits is by estimating the benefits in the form of future tax returns. Hansen and Weisbrod found that in no case do State and local taxpayers recoup the full value of their investment in higher education. [15]

Economic benefits found by rate-of-return analysis, or any other economic tool currently in use, fall far short of a complete determination of social and private benefits accrued from investing in education. Education, however, still possesses formidable economic benefits, implying that investing greater sums in the development of human capital through education is sound economic policy.

ECONOMIC IMPACT ANALYSIS

The economic impact analysis is actually a series of linear cash-flow formulas which include only what can be readily counted. The formulas attempt to identify who is spending, how much is spent, what is being bought, and where spending is being done. They do not show political, social, or aesthetic impacts or the effects upon the community of the colleges' human resources. They do measure dollar outlay and provide simple indicators for planning. [7]

Most of the effects considered in an economic impact analysis are current and short range. They are not concerned with the ultimate impact of the college upon the community, and they do not consider what a community might have been like without the college.

One of the problems associated with economic impact analysis is the determination of the multiplier effect. The purpose of a multiplier is to reflect the final impact of an initial expenditure. The smaller and less self-sufficient the region, the larger the portion of respending that leaks out and the smaller the multiplier effect of the original investment. The larger the region, the greater is the total cycle of respending recaptured by the region, and the larger the multiplier. [18] A multiplier effect of 2.0 is generally accepted for a Statewide region. [4, 14, 35]

The results of studies employing techniques of economic impact analysis have generally found that nonprofit, nontax institutions have a capacity to generate employment and millions of dollars in personal income through what is in effect interregional trade. In addition, the subsequent expenditure of that income in the local economy can make an important contribution to economic growth.

A study of Virginia community colleges, for example, demonstrated that higher education institutions give more to the communities than they take. The business volume generated by the presence of the community college system exceeded the State's appropriation for the system by 142 percent for the eight-year period of the study. [47] Other studies also have shown significant benefits. The operation of Harrisburg Area Community College contributed from $2 to $4.5 million annually to the cash flow of the local economy, while the total operating budget of the college was $3.8 million for the year in which the estimate was based. [36]

The Johns Hopkins University, through nonprofit, was found to rival a number of Baltimore's major local businesses in total volume of local business expenditures. Total direct and indirect expenditures attributable to Hopkins in 1972-73 were more than $137 million. However, it receives more in services from the City than it contributes in taxes. The tax-exempt status perhaps recognizes contributions of those unpaid services to the community. [21]

A similar study at the University of Rhode Island showed it generates about $81 million of business in the state and $31 million in the local area. [6] Another study of higher education institutions in North Dakota found that for each dollar the state appropriated to higher education, the colleges and universities returned $2.10 to the economy of the state, and that total college-related spending provided the state about 10,000 jobs. [11] Gamber's study of St. Cloud State University, Minnesota estimates that university-related spending in the St. Cloud area in 1975 amounted to more than $27 million with an ultimate effect of nearly $59 million. [13]

Most studies indicate that by its presence a college can generate a considerable dollar volume of spending, create jobs, and add stability. Measuring a college's economic accountability can also provide a frame of reference in which to evaluate the college on other more important criteria. (See Appendix D for a complete literature review.)

PART I: ECONOMIC IMPACT OF EXPENDITURES

CHAPTER 1

The seventeen Maryland community colleges circulate funds through the economy by expenditures for salaries, purchase of materials, and capital building improvements. The funds come from internal sources, including State and local appropriations, student fees and tuition, and from external sources, such as the federal government. It is through the circulation of these funds that the colleges generate their economic impact.

The purpose of this part of the study is to estimate the effect of the Maryland community colleges on the State's economy. In the past higher education has not been measured by economic criteria; more idealistic goals have been used instead. These goals are probably still the most valid measures of success, but as the cost of higher education increases, other criteria have become increasingly important. The utility of education in the work force and the economic impact of higher education on a community and a state are two such criteria. The effect of the product, or the educated individual, will be discussed in Part II. This section will look at the actual effect of the income and expenditures of the seventeen community colleges on the State's economy.

Linear cash-flow equations are used in this study and include only what can be readily counted. They attempt to identify who is spending, how much is spent, and where spending is being done. No single figure tells the story. A college can have several kinds of economic impacts, some of which might be more important than others. The impacts considered in this part of the study are current (FY 1977) and short range. This study also tries to look at both sides of the picture, not only the benefits of spending by colleges and their staffs in the State, but also the costs of supporting them.

The equations or models use data that are available from the State Board for Community Colleges and college records, State and local governments, federal and State statistical publications, and the literature in general. A balance was attempted between accuracy and ease of data acquisition. The models developed by Caffrey and Isaacs and published by the American Council on Education [7] were modified to apply to community colleges and a statewide system of higher education. They should not be expected to reflect a comprehensive, in-depth picture of all possible economic relationships between the colleges and the State. The precision of the figures in this part of the study may not be as important as their clarity. The assumptions behind them are specific but may be modified if additional information becomes available. As a general rule, the approach has been conservative in nature. If a larger benefit could not be documented, even though it appeared to be accurate, the more conservative figure was used.

In one regard, the study measures "inclusive" impacts, in the sense that it includes all full-time employees who might or might not have lived and worked in Maryland if the colleges did not exist. However, student impacts were not assessed because it could be argued that they would have lived, and, therefore, spent their money in Maryland regardless of the community colleges. (Only 3 percent of the total student population came from out-of-state.) The younger students, for example, might have entered one of the State colleges or universities, while older, part-time students might have elected to go to a State institution or a proprietary school.

The study area includes the entire State of Maryland, including those counties which do not have a community college. The State Board for Community Colleges estimates that over 98 percent of the Maryland population has direct access to a community college. The colleges serve rural students as well as suburban and urban populations that live in the three Standard Metropolitan Statistical Areas (SMSAs) of Baltimore City, Washington, D. C., and Wilmington, Delaware. In the Fall of 1976, almost 80,000 students were enrolled in credit programs in Maryland community colleges and thousands more attended noncredit classes.

The primary purpose of community colleges has never been to create jobs, generate business for entrepreneurs, or boost sales of durable goods in Maryland--such functions alone can be better performed by a variety of other institutions in the public and private sectors. Community colleges do make higher education accessible to a diverse cross-section of Maryland citizens and in carrying out this primary task, create jobs, generate business, and increase sales.

SUMMARY OF THE STATEWIDE ECONOMIC IMPACT OF MARYLAND COMMUNITY COLLEGES

This section discusses the major findings and results of the Statewide Economic Impact Study. Although all the impacts originate with the activities of the seventeen Maryland community colleges, there are two basic channels through which they flow into the State: the institutions themselves acting as corporate entities, and the faculties and staffs of the colleges acting as individuals. The details of each calculation and sources of data are included in the comprehensive report available at the State Board for Community Colleges. All figures are for the 1977 fiscal year unless otherwise specified.

BUSINESS SECTOR

The numbers in this section attempt to estimate economic impacts of the Maryland community colleges on State businesses. This study estimates impacts of the expenditures in Maryland of the colleges, their faculties and staffs; additional spending stimulated by college-related purchases; the value of State business property committed to college-related business; expansion of Maryland banks' credit base resulting from college-related deposits; and the business volume unrealized because of the colleges' auxiliary enterprises.

What was the total impact of expenditures by the Maryland community colleges and their staffs?

The Maryland community colleges rival many of the State's businesses in total volume of business expenditures in the State and local subdivisions. Total direct and indirect expenditures attributable to the seventeen colleges in 1976-77 were almost $124 million. Of this, almost $62 million were direct expenditures by the colleges and their staffs. This includes in-State expenditures by colleges for supplies and other goods and services: by in-State faculty and staff for housing, goods, and services; and by out-of-state employees for goods and services. Another $62 million were indirect expenditures by local businesses and individuals in support of their college-related business volume. Total direct and indirect expenditures are computed by applying the accepted Statewide multiplier effect of 2.0 on the direct State expenditures. The multiplier effect is an economic gauge of the expansion of dollars injected into an area from a single source resulting from cycles of respending.

One of the reasons the colleges' impact is so significant is that more than 95 percent of their staffs live in Maryland. Because education is labor intensive, about 75 percent of the colleges' budgets are for compensation of employees, and almost all of the more than $62 million of disposable income (net income after deduction of taxes and Social Security contributions) that faculty and staff receive from the colleges is spent in Maryland. The colleges themselves also buy almost 70 percent of their goods and services from suppliers and individuals in Maryland.

What were the sources of funds for Maryland community colleges in FY 1977?

Maryland community colleges in FY 1977 received a total of $28.6 million from student tuition and fees, $37.7 million from State sources, $31.8 million from local sources, $4.4 million from federal sources (not including pass-through funds received by the colleges for student aid), and $2.1 million from other sources.

How much Maryland business property exists in support of the expenditures of Maryland community colleges and their employees?

The direct expenditures by the colleges and their faculties and staffs do not capture the full impact of such activities on the economic base of the State. The value of Maryland business property, including both real estate and inventories that existed in order to service the colleges and college-related business transactions, was worth an estimated $53 million in 1976-77.

How much did the credit base of Maryland's banks expand as a result of Maryland community colleges?

Both personal and business incomes related to college activity have an additional impact on the State through their expansion of the credit base in State banks. The Maryland credit base was increased by about $25 million as a direct consequence of college-related deposits. A large percentage of this effect comes from the personal accounts of faculty and staff, as well as the cash deposits of business related to their college transactions. The colleges themselves deposited an average of $11 million in time and demand accounts in State banks.

How much State business volume was unrealized in the business sector because of Maryland community colleges?

To the extent that the colleges operate enterprises or provide services in competition with business, the receipts from these activities should be recognized as net subtractions from potential business volume. The receipts from college-operated cafeterias, bookstores, day care centers, and other auxiliary enterprises make up about $5 million of foregone business by State enterprises. This amount should be netted out against the positive impact on State business volume detailed earlier. This figure is probably high because it does not take into account the business that exists because there is a college, such as book sales in a bookstore.

GOVERNMENT SECTOR

Educational institutions not only hold significant amounts of real property exempt from taxation, but colleges and their staffs also make demands on government for a variety of services, from education to health. The following figures outline the contributions made by college-related influences to the public sector and then assess the cost to the State in terms of foregone property taxes, costs of services, and the operating costs of public schools attributable to the colleges and the households of their staffs.

How much tax revenue and transfer payments did the State of Maryland receive because of the presence of the colleges?

Although the colleges operate under a tax-exempt status, they are nonetheless responsible for direct and indirect cash payments to the State. It is estimated that Maryland in 1976-77 received cash revenues of about $9 million from taxes paid by faculty and staff, from the federal government, and from taxes on business property allocable to college transactions. The sources of these revenues were real and nonreal property taxes ($153,000), federal aid to public schools for children of college-related families ($286,000), federal aid to community colleges ($4,400,000, excluding student aid), State income taxes ($2,445,000), and State sales taxes ($1,506,000).

How much revenue did the local jurisdictions receive because of the presence of the colleges?

Local jurisdictions received an additional $48.7 million directly or indirectly from the community colleges. This includes State and federal aid (including aid for the colleges, but not federal student aid) and other local government receipts derived from the colleges, their faculties and staffs, and the related business activity, such as income tax.

How much did it cost the State of Maryland to provide services for colleges and their staffs?

The State provided services for the faculties and staffs of the colleges valued at more than $8.8 million: $1.9 million of this represented the cost to the State of providing public school education for the children of college personnel, and the balance, $6.9 million, represented the expenditures for services other than education. Faculty and staff members are estimated to have 2,761 children in the public schools. Because no allowances were made for personnel who would live in Maryland in the absence of community colleges, the estimate of total costs may have been overstated.

What is the value of State property related to services provided for the colleges and their employees?

An indirect cost is the value of State property which is allocated to that portion of services the State provides for college-related activities. This represents the public investment in State property necessary to service the college and its staff. It is similar to the investment in plants, equipment, and inventories in the business sector that existed in support of the colleges and their staffs.

Earlier it was estimated that the value of the services Maryland provides the colleges and their staffs was over $8 million. This study attempts to calculate what proportion of all State-owned property exists in support of these services required by the colleges and their staffs. The value of State property related to the colleges is estimated to be $1.3 million.

How much State real estate taxes were foregone by the State of Maryland because of the tax-exempt status of the colleges in FY 1977?

Foregone State real estate taxes on the colleges' tax-exempt property are estimated at $22,000, based on a tax rate of 23 cents per $100 of assessed value. The simplified procedure which was used to avoid complex estimations of property values has probably resulted in an understatement of the value of both State and local foregone property taxes.

How much local real estate taxes were foregone by the local jurisdictions because of the tax-exempt status of the colleges?

The local jurisdictions were not able to realize another $557,000 in real estate taxes because of the colleges.

These estimates for both local and State foregone taxes are based on a simplified procedure which essentially multiplies the total property tax revenues of the jurisdiction by the college's proportional share of the geographical area. This was done to avoid making specific assumptions about the value of each piece of property and, more importantly, its relation to the value of surrounding property. It also should be noted that the colleges self-provided over $1 million in public municipal-type services, such as security, street lighting, road maintenance, and garbage collection.

GENERAL EMPLOYMENT

How many full-time jobs are available in Maryland because of the colleges?

Impacts from the seventeen community colleges on private individuals in the State of Maryland are largely through jobs and employment opportunities. It is estimated that about 6,700 jobs in Maryland are a result of the activities of the community colleges, 4,450 of these directly with the colleges, and 3,250 created as a consequence of college-related business and government expenditures. The total jobs are calculated by multiplying a conservative employment multiplier effect of 1.5 by the number of full-time jobs at Maryland community colleges in 1976-77.

PART I: ECONOMIC IMPACT OF EXPENDITURES

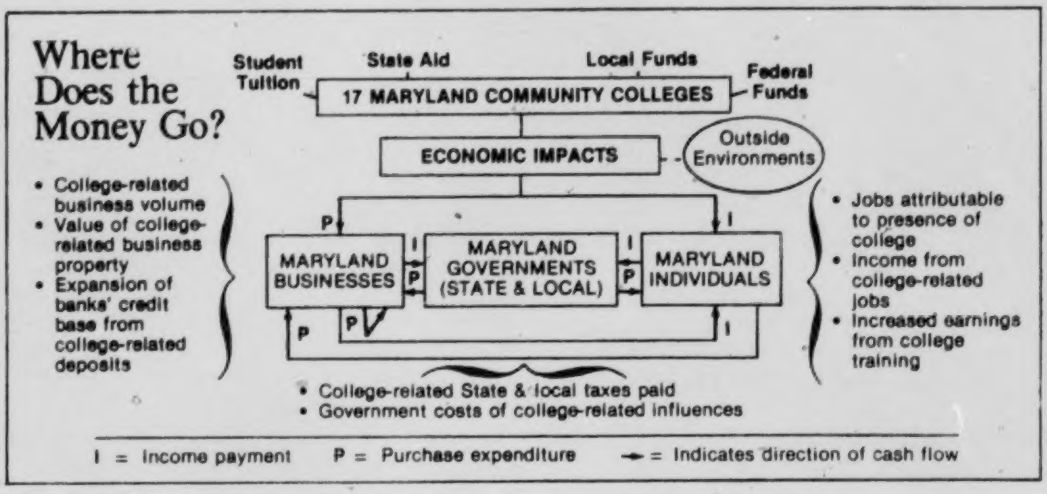
CHAPTER 2

The previous chapter described the economic impact of the Maryland community colleges on the economy of the State of Maryland. The purpose of this section is to explain the methods that were used to estimate the magnitude of these impacts.

Illustration 1 portrays in a schematic form the income-expenditure relationship between the colleges, income recipients, and the surrounding business community. The direction of the arrows indicates the direction of either an income payment flow (I) or a purchase expenditure flow (P). The term "income payment" refers primarily to wages and salaries paid by employers to employees. The term "purchase expenditure" refers to purchases by consumers and purchase of intermediate products by business. A main objective of this study is to estimate, where feasible, the magnitude of cash flows in Maryland which are related to the seventeen community colleges. The only out-of-state flow estimated in this study is the level of in-State expenditures by out-of-state faculty and staff.

ILLUSTRATION 1

MARYLAND COMMUNITY COLLEGES
WHERE DOES THE MONEY GO?


Where Does the Money Go?
Student Tuition
State Aid
Local Funds
Federal Funds
17 MARYLAND COMMUNITY COLLEGES
ECONOMIC IMPACTS
Outside Environments
• College-related business volume
• Value of college-related business property
• Expansion of banks' credit base from college-related deposits
P
I
MARYLAND BUSINESSES
MARYLAND GOVERNMENTS (STATE & LOCAL)
MARYLAND INDIVIDUALS
• Jobs attributable to presence of college
• Income from college-related jobs
• Increased earnings from college training
• College-related State & local taxes paid
• Government costs of college-related influences
I = Income payment
P = Purchase expenditure
→ = Indicates direction of cash flow

An essential point which is not explicitly shown in Illustration 1 is that an increased level of purchases from both Maryland and out-of-state businesses results in increased income in the form of wages, interest, rent, and profit. Additional income flows generate additional purchases, which in turn create additional income. A circular process results within the period of a year causing in economic terms a "multiplied effect." This means that the total income for the participants as a group is increased.

The models or formulas used in this study are not appropriate for either planning or forecasting purposes. They do not include business cycle impacts on the State nor do they take into consideration multi-region interdependence. This means they do not take into account the temp of economic activity, the economic calendar, or economic stability. The models do describe, however, what is happening to the money the public invests in Maryland's community colleges.

The models are also limited to estimating short-term economic impact. They are not concerned with the ultimate economic impact of the colleges upon the State, and they do not consider what the State might have been like without the colleges. The type of impact reported in this study applies to operations in a typical year, with the assumption that this would be similar to other years.

Perhaps most importantly, the models provide a built-in understatement. The actual economic impacts are probably greater than the figures suggest. The models also are flexible and comprehensive in the measurement of dollar outlay, and they indicate where and how the dollars invested in community colleges were spent.

One other factor should be noted before the models are discussed in detail. The impact of student expenditures and costs are not included directly in the study. First of all, a primary goal of the study was to use only data that was already available or could be easily calculated. Estimates of student expenditures can be based on similar studies, but the unique characteristics of community college students make comparisons difficult. Most studies which break down student expenditures not only have significant discrepancies, but also measure traditional four-year students. Without generating additional survey data, it also is difficult to determine factors such as the number of students living with parents or other relatives, or how many would live in Maryland regardless of a community college. In addition, many residents probably would not be pursuing higher education if the community colleges did not exist.

A second factor that makes the inclusion of students questionable is the increasing number of part-time students in the State's community colleges. They can be considered as college-related, but college may not be their major activity. Omitting student impacts probably lowers the estimate of the total college impact. However, calculations from questionable estimates only provide questionable results which in turn weaken the overall study.

The models, based on Caffrey and Isaacs' study, are designed to assess the impacts on two sectors of the State's economy, business, and government.

Because attention is focused on the variety of impacts on each major sector rather than on a simple net positive or negative impact, there is no summary business or government model. The notation scheme used in the models represents variables with capital letters, coefficients (factional multipliers) with lower-case letters, and indexes with mnemonics.

The rest of this chapter presents each of the models and sub-models. A detailed discussion including an evaluation of estimating procedures, data sources, and computations is included with the presentation of each of the models. Wherever computation or estimating procedures are too complex or distracting, they have been placed in an appendix and so referenced. The same questions asked in Chapter 1 will be answered in more detail to allow the reader to make comparisons and determine what factors are included or excluded.

BUSINESS SECTOR

What was the total impact of expenditures by the Maryland community colleges and their staffs?

The answer to this question is the one most extensively estimated in this study, and it is probably of greatest importance in terms of dollar-measured activity. The total impact of about $124 million is calculated by applying the multiplier effect to the total college-related State expenditures of about $62 million. Economists use a "multiplier effect" to gauge the expansion of dollars as they are respent within an economy. For example, the expenditures by a resident in Maryland become additional income to the recipient of the expenditures. If the recipient is a local business, part of the recipient's income becomes wages paid to employees, rent, interest on borrowed funds, or either dividends or proprietor's income to owners. Additional consumer spending in the State means additional consumer income to someone--workers, landlords, lenders, owners, or to all four groups in varying proportions. Part of this additional consumer income is then respent, some of it locally, some nonlocally. Because a state has such a varied economic base, fewer dollars "leak" out to other regions. Therefore, Statewide multipliers are larger than those used for smaller jurisdictions. Most economists would agree that the 2.0 multiplier used in this study is acceptable.

There is some question about whether spending for community colleges is really an additional spending. It could be argued that the money would have been spent for other public or private alternatives if the colleges did not exist. In that case, the multiplier should be applied only to federal or other outside funds coming into the State. However, because this study is attempting to assess the total impact of dollars spent, the multiplier is applied to total expenditures. (A more complete presentation of the multiplier concept is presented in Appendix A.)

BV_{CR}

Business volume in Maryland related to the activities of the Maryland community colleges.

$$BV_{CR} = m\,[(E_L)_{CR}]$$
$$= (2.0)\ (\$61{,}882{,}502)$$
$$= \$123{,}765{,}004$$

Variables:

m = multiplier effect (see Appendix A)

$(E_L)_{CR}$ = college-related local expenditures

College-related expenditures:

The college-related expenditures include expenditures by the colleges as institutions and expenditures by the faculties and staffs. This formula serves a simple accumulating function rather than a specific estimating function.

$(E_L)_{CR}$

Expenditures in Maryland related to the activities of community colleges.

$$(E_L)_{CR} = (E_L)_C + (E_L)_F$$
$$= \$17{,}261{,}885 + \$44{,}620{,}617$$
$$= \$61{,}802{,}502$$

Variables:

$(E_L)_C$ = in-State expenditures by the college

$(E_L)_F$ = in-State expenditures by faculty and staff

1 - College Expenditures.

The colleges buy various goods and supplies to maintain their operation, such as paper products, cleaning supplies, typewriters, and maintenance vehicles. This model looks at where the colleges spend these kinds of funds. The proportion of in-State spending was derived from a sample of college vendor records, excluding wages and salaries, taxes, and other payments to governments. Wages and salaries will be treated in several of the subsequent formulas. Taxes and other payments to all governments are excluded because they are not in the business sector.

Almost 68 percent of college purchases for goods and supplies were made within the State of Maryland in FY 1977. Total college expenditures and gross compensation were taken from the annual audit reports submitted by the colleges, but because student impacts are not being calculated, federal work-study funds were excluded. Information about payments to governments came from college budgets or from information supplied by the college business offices.

$$(E_L)_C$$

Expenditures by Maryland community colleges.

$$(E_L)_C = (e_L)_C\ (E_C - W_F - R_C)$$

$$= (.6797)\ (\$108,208,581 - \$82,679,618 - \$132,633)$$

$$= \$17,261,885$$

Variables:

$(e_L)_C$ = proportion of total college expenditures that are in-State, excluding compensation, internal items, and taxes

E_C = total college expenditures

W_F = gross compensation to faculty, staff

R_C = taxes and other payments to governments

2 - Faculty and Staff Expenditures.

Faculty and staff purchases made in Maryland are estimated in the next model, which considers both rental housing expenditures and nonhousing expenditures by in-State residents. Expenditures on owner-occupied housing will be addressed later as part of the value of real property related to the colleges. Only nonhousing expenditures are considered for those faculty and staff living outside of Maryland.

$$(E_L)_F$$

Expenditures in Maryland by faculty and staff.

$$(E_L)_F = (E_H)_F + (E_{NH})_F + (E_L)_{NLF}$$

$$= \$7,500,039 + \$37,059,017 + \$61,561$$

$$= \$44,620,617$$

Variables:

$(E_H)_F$ = expenditures by faculty and staff for rental housing in Maryland

$(E_{NH})_F$ = nonhousing expenditures by faculty and staff in Maryland

$(E_L)_{NLF}$ = in-State expenditures by out-of-state faculty and staff

The housing expenditures of homeowners are excluded from the impact estimate because most of the amount represents a capital rather than a current transaction. Expenditures in the form of mortgages reflect primarily an accumulation of previous savings and lending transactions rather than current income. This model is a good example of how the total figures may underestimate the impact of the colleges in the State. Excluded from this formula are factors such as payments to real estate brokers, payment of interest charges on outstanding mortgages to State banks, and payments of homeowners' insurance premiums.

a) Rental housing expenditures.

Expenditures by faculty and staff living in Maryland for rental housing was about \$7.5 million. Both this formula and the one measuring nonhousing expenditures assume that income from the colleges equal expenditures. This is probably not the case in a number of households, particularly those in which positive savings exist, other wage earners supplement the households' income, or where there is additional income from dividends, royalities, or family business profits. To the extent that some income received by the colleges' employees is not spent, the expenditure impact estimates are overstated. At the same time, however, a household's total expenditures are likely to be no less than the employee's salary after normal deductions. Because additional income sources do very often exist, the household will probably have a higher standard of living than if the only income was the salary from the colleges. The net result, then, is probably an understatement of the actual purchase of goods and services by faculty and staff living in Maryland.

$(E_H)_F$

Expenditures by faculty and staff for rental housing.

$$(E_H)_F = (f_L)\ (f_H)\ (DI_F)\ (e_H)$$

$$= (.9540)\ (.4120)\ (\$62{,}358{,}624)\ (.3060)$$

$$= \$7{,}500{,}039$$

Variables:

(f_L) = proportion of faculty and staff residing in Maryland

(f_H) = proportion of Maryland faculty and staff who rent housing

(DI_F) = total disposable income of faculty and staff

(e_H) = proportion of a tenant's total expenditures likely to be spent for rental housing

b) Nonhousing expenditures.

$(E_{NH})_F$

Nonhousing expenditures by faculty and staff.

$$(E_{NH})_F = (f_L)\ (e_L)\ (DI_F)\ (e_{NH})_F$$

$$= (.9540)\ (.9888)\ (\$62{,}358{,}624)\ (.6300)$$

$$= \$37{,}059{,}017$$

Variables:

(f_L) = proportion of faculty and staff residing in Maryland

(e_L) = proportion of total nonhousing expenditures that an individual is likely to make in his local environment

(DI_F) = total disposable income of faculty and staff

$(e_{NH})_F$ = proportion of a consumer's total expenditures spent on nonhousing items

The proportion of faculty and staff residing in Maryland was calculated from address lists provided by the colleges. Because existing data for most colleges does not include information about the housing status of faculty and staff, it is assumed that college employees as a whole do not differ substantially from the population of Maryland as a whole. The most recent statistics from the U. S. Census Bureau indicate that about 41.2 percent of Maryland residents rent housing. [38] This figure may seem too high for college employees, but with no empirical data available it is felt that the Census figure is more reliable than one based on guesswork.

The total disposable income was calculated from college payroll figures which net out tax, social security, insurance, and other payments from gross compensation. In some cases colleges supplied an annual net figure for FY 1977, while others supplied sample weeks from which annual figures were estimated.

In most of the formulas only full-time faculty are considered because it could be argued that the part-time personnel would have lived in Maryland regardless of the community colleges. However, because it is difficult for the colleges to separate from the payroll only those employees working full-time, the total compensation figure was used. The rationale is that part-time employees spend the same proportion of their college income for rental and nonhousing items as full-time employees.

The proportion of a person's income that is likely to be spent for rental housing or nonhousing expenditures was estimated from the Bureau of Labor Statistics report, *Three Standards of Living for an Urban Family of Four Persons.* [43] This report lists three levels of annual costs per family in a number of metropolitan areas and non-metropolitan regions in the United States. The estimate of the proportion of nonhousing expenditures the colleges' employees are likely to make in Maryland (.9888) was made using the gravity theory, which states that the amount of money spent is inversely proportional to the square of the distance to the point of purchase. (See Appendix B for additional information on the gravity theory.)

c) Expenditures made by out-of-state faculty and staff.

Faculty and staff residing outside Maryland make some purchases within the State although a much smaller proportion than for those living in-State. It is estimated that these expenditures are about $60,000.

$(E_L)_{NLF}$

Expenditures made in Maryland by out-of-state faculty and staff.

$$
\begin{aligned}
(E_L)_{NLF} &= (1 - f_L)\ (F)\ (E_l)_F \\
&= (.046)\ (4{,}461)\ (\$300) \\
&= \$61{,}561
\end{aligned}
$$

Variables:

f_L = proportion of faculty and staff residing in Maryland

F = total number of faculty and staff

$(E_l)_F$ = estimated average local expenditures by each nonlocal faculty and staff person

The proportion of faculty living out-of-state is calculated by subtracting the proportion living in-State from one. The total number of faculty and staff includes all full-time employees as reported by the colleges to the State Board for Higher Education. It is felt that the inclusion of part-time employees would have overstated this impact. The average local expenditures by out-of-state employees is an estimate based on similar studies.

How much Maryland business property exists in support of the expenditures of Maryland community colleges and their employees?

The worth of the capital and property related to the business activity generated by the presence of the colleges is estimated to be $53,372,995. The formulas in this section attempt to determine what portions of the existing capital and property relate to the observed flow of purchases that are college related. In effect, it is an indication of how much capital and property were employed by business enterprises for each dollar of sales in FY 1977. This average figure is then apportioned to college-related sales.

$$(PR_B)_{CR}$$

Value of Maryland business property committed to college-related business.

$$\begin{aligned}(PR_B)_{CR} &= (RP_B)_{CR} + (I_B)_{CR}\\ &= \$38,443,583 + \$14,851,800\\ &= \$53,295,383\end{aligned}$$

Variables:

$(RP_B)_{CR}$ = value of State business real property committed to college-related business

$(I_B)_{CR}$ = value of State business inventory committed to college-related business

1 - College-related business real property in Maryland.

The dollar value of Maryland businesses' real property that is employed to service college-related sales is estimated to be about $38 million.

$$(RP_B)_{CR}$$

Value of college-related real business property in Maryland.

$$\begin{aligned}(RP_B)_{CR} &= \left(\frac{BV_{CR}}{BV_L}\right)\left(\frac{V_B}{amv}\right)\\ &= \left(\frac{\$123,765,004}{\$38,282,022,100}\right)\left(\frac{\$5,755,276,992}{0.484}\right)\\ &= \$38,499,567\end{aligned}$$

Variables:

BV_{CR} = college-related business volume in Maryland

BV_L = Maryland business volume

V_B = assessed valuation of Maryland business real property

amv = ratio of assessed value to market value of taxable real property

The total market value of real business property is calculated by dividing the assessed value of business property by the Maryland ratio of assessed value to market value of taxable real property. The ratio of assessed value to market value is an estimate from the State Department of Assessment and Taxation based on surveys and actual sale prices.[24] The use of assessed value to estimate market value of real business property introduces a potential downward bias because during periods of rising prices as at present, real property tends to be undervalued even when re-assessments are quite frequent. The assessed valuation of Maryland business real property for 1976 also came from the Department of Assessment and Taxation.

The total Maryland business volume is estimated by first obtaining the sum of the dollar volume of retail, selected services, and wholesale sales, and value-added by manufacturing in the State. Because the most recent figures are for 1972, this sum is then weighted by the ratio of 1976 State sales tax receipts to 1972 sales tax receipts to make the business volume estimate more representative of current conditions. (See Appendix C.)

2 - College-related inventory.

The value of inventory required to support college-related demands is estimated to be about $15 million. This figure is the product of the total college-related business volume times the estimated average inventory-to-business volume ratio for businesses in Maryland.

$$(I_B)_{CR}$$

Value of Maryland business inventory committed to college-related business.

$$\begin{aligned}(I_B)_{CR} &= (ibv)\ (BV_{CR})\\ &= (.12)\ (\$123,765,004)\\ &= \$14,851,800\end{aligned}$$

Variables:

ibv = inventory-to-business volume ratio

BV_{CR} = college-related business volume

The ratio of inventory-to-business volume is computed from business income tax returns in the U. S. Internal Revenue Service's *Statistics of Income*. [44] The figures represent corporations only but are not significantly altered if partnerships with balance sheets are included. Firms engaged in agriculture, mining, finance, insurance, and real estate have been excluded because the asset structure tends to overstate the desired statistics. The .12 ratio is an acceptable figure, but an actual survey of Maryland inventories might have resulted in a slightly higher or lower estimate.

The estimation of both inventory and business real property is based on the impact of the colleges' operation for one year, FY 1977. The colleges as a group have been in operation for many years, and the actual process of added inventory investment has been a gradual one reflecting the growth in the overall operations of Maryland community colleges. Keeping in mind the simplified assumptions of this study, it is felt that the computations for the value of college-related business property are a reasonable approximation.

How much did the credit base of Maryland's banks expand as a result of the Maryland community colleges?

The impact of the seventeen Maryland community colleges increased the supply of credit in Maryland by over \$25 million in FY 1977. A bank's credit base depends on the average level of time and demand deposits which the bank holds for its customers. Not all of these deposits, however, are available to the bank for making loans and investments because the bank is required by the Federal Reserve Board to retain a small percentage of the total time and demand deposits.

Average deposits by the colleges, their personnel, and Maryland business establishments as a consequence of their college-related business are available to State banks for loans and investments except that small portion which must be held in reserve. This study makes no attempt to assess personal savings in terms of equity in automobiles and homes and in financial assets such as stocks and bonds. Liquid financial assets, such as checking and savings accounts, are used because of the more obvious relationship to State credit conditions.

CB

Expansion of bank credit base in Maryland from college-related deposits.

$$\begin{aligned} CB &= (1-t)\,[TD_C + (TD_F)\,(F)] + (1-d)\,[DD_C + (DD_F)\,(F) + (cbv)\,(BV_{CR})] \\ &= (1-.03)\,[\$9{,}507{,}803 + (\$2{,}063)\,(\$4{,}461)] + \\ &\quad (1-.175)\,[\$1{,}745{,}970 + (\$579)\,(\$4{,}461) + (.037)\,(\$123{,}765{,}004)] \\ &= \$25{,}498{,}780 \end{aligned}$$

Variables:

t = Maryland time deposit reserve requirement

TD_C = average time deposit of the college in Maryland banks

TD_F = average time deposit of each faculty and staff person in Maryland banks

F = total number of faculty and staff

d = Maryland demand deposit reserve requirement

DD_C = average demand deposit of the college in Maryland banks

DD_F = average demand deposit of each faculty and staff person in Maryland banks

cbv = cash-to-business volume ratio

BV_{CR} = college-related business volume in Maryland

The average time and demand deposits of the colleges were based on estimates made by the seventeen colleges. The average deposits of faculty and staff require the use of State Board for Community Colleges salary information and statistics showing bank deposits by selected income categories. Average deposits for full-time support staff and for full-time administrators and faculty were estimated for type of employee using a study by the Federal Reserve Board which showed average deposits per income category. [32] Those results were then weighted according to the number of support staff and professional staff employed at the colleges, and an average time deposit and demand deposit for all employees was computed.

Although the savings behavior of faculty and staff may not be identical to national estimates, the basic saving rates and motivations for savings should not be too dissimilar. These estimates are also compatible with similar studies which used survey data. Even those studies using survey instruments to determine spending and savings patterns found a high degree of resistance to questions concerning financial assets, and often were forced to rely on national savings rates.

This is a very rough attempt to measure dollar amounts in areas of economic behavior that are both conceptually and empirically difficult. It does, however, provide a feel for the impact of the colleges on the State's credit base although the estimate of $25 million may overstate or understate the actual impact. Even if the figure is slightly inflated, the colleges still make a significant impact on the State's credit base.

How much Maryland business volume was unrealized in the business sector because of the Maryland community colleges?

To the extent that the colleges operate business enterprises, they compete with other Maryland businesses. The dollars that the colleges receive from the competing businesses they operate, such as bookstores, cafeterias, and day care centers, are dollars that are foregone by other Maryland establishments. In Maryland this business volume is estimated to be over $5 million. The operation of these auxiliary enterprises has a negative impact on the private business sector of the Maryland economy which must be netted out against the positive additions to sales and income in the business sector.

$$(BV_U)C$$

Maryland business volume unrealized because of college activities.

$$(BV_U)_C = \$5,670,513$$

The $5.7 million includes all revenues received from college-operated enterprises as reported in the annual reports of the colleges. The gross amount was used in order to be compatible with the figure representing the total college-related business volume.

GOVERNMENT SECTOR

While the major economic impact of the Maryland community colleges takes place in the business sector, there are also significant impacts in the government sector. This set of formulas is designed to reveal the effects of the colleges upon government revenues and expenditures. There is a temptation to compare revenues with expenditures because it seems logical that if revenues exceed expenditures, the State and local jurisdictions come out ahead. Or if expenditures exceed revenues, they come up short. The formulas, however, are intended to provide only estimates of the impact of the colleges on State and local governments. A simple balance sheet is not acceptable when so many important, unmeasurable, and intangible factors are beyond exact quantitative analysis.

The colleges are not businesses promoted to bring the State added tax dollars. The State, in its support of community colleges, is making an investment in education and the future of its citizens.

How much tax revenue and transfer payments did the State of Maryland receive because of the presence of the colleges?

The annual tax receipts and outside aid derived from the colleges and from college-related personnel and business activities is estimated to be about $9 million in 1976-77. This includes real estate and property taxes, sales tax revenue, income tax receipts, and federal aid allocable to the presence of the colleges.

R_{CR}

College-related revenue received by Maryland.

$$R_{CR} = (R_{RE})_{CR} + (R_{NRE})_{CR} + (R_{ST})_{CR} + (R_I)_{CR} + (R_A)_{CH} + (R_F)_{CR} + (R_F)_C$$

$$= \$153{,}282 + \$73{,}112 + \$1{,}506{,}052 + \$2{,}445{,}167 + \$286{,}196 + \$139{,}406 + \$4{,}374{,}009$$

$$= \$8{,}977{,}226$$

Variables:

$(R_{RE})_{CR}$ = college-related real estate taxes paid to the State

$(R_{NRE})_{CR}$ = college-related property taxes, other than real estate paid to the State

$(R_{ST})_{CR}$ = sales tax revenue received by the State as a result of college-related purchases

$(R_I)_{CR}$ = income tax received by the State allocable to college-related influences

$(R_A)_{CH}$ = federal aid to public schools allocable to the presence of the colleges

$(R_F)_{CR}$ = federal revenue sharing to the State allocable to the presence of the college

$(R_F)_C$ = federal aid for community colleges, excluding aid to students

Federal aid for community college students, which comes primarily from Basic and Supplemental Educational Opportunity Grants and work-study funding, is excluded primarily because this study is not attempting to gauge student impacts. The colleges serve a pass-through function for these funds which are usually applied to tuition and living expenses. Other federal aid, as reported by the colleges in annual audit reports, was over $4 million.

1 - Real estate taxes.

The State received about $150,000 in real estate taxes in 1976-77 as a result of the seventeen community colleges. This includes taxes paid by the college faculties and staffs and by businesses for real property allocable to their college-related business. Only two colleges, Wor-Wic Tech and Catonsville, paid real estate taxes indirectly to the State through rental fees.

$$(R_{RE})_{CR}$$

College-related real estate taxes paid to Maryland.

$$\begin{aligned}(R_{RE})_{CR} &= (R_{RE})_C + (R_{RE})_F + (R_{RE,B})_{CR}\\ &= \$50 + \$110,437 + \$42,795\\ &= \$153,282\end{aligned}$$

Variables:

$(R_{RE})_C$ = real estate taxes paid to Maryland by the colleges

$(R_{RE})_F$ = real estate taxes paid to Maryland by faculty and staff living in Maryland

$(R_{RE,B})_{CR}$ = real estate taxes paid to Maryland by businesses for real property allocable to college-related business

a) Faculty and staff real estate taxes.

Faculty and staff living in Maryland paid approximately $110,000 in real estate taxes to the State. This was found by multiplying an estimate of the number of college personnel who own homes by the amount of tax paid for an average home in Maryland.

$(R_{RE})_F$

Real estate taxes paid to Maryland by college faculty and staff.

$$(R_{RE})_F = [(F_L)\ (1 - f_H)] \left[pt \frac{V_{PR}}{N_{PR}} \right]$$

$$= [(\$4,256)\ (1 - .412)] \left[.0023 \frac{\$14,616,056,064}{\$761,767} \right]$$

$$= \$110,437$$

Variables:

F_L = number of faculty and staff residing in Maryland

f_H = proportion of faculty and staff who rent housing

pt = State property tax rate

V_{PR} = total assessed valuation of all State private residences

N_{PR} = total number of private residences in Maryland

The number of faculty and staff residing in Maryland is found by multiplying the proportion of in-State personnel (used in a formula above) times the total number of full-time faculty and staff at the colleges. This number is multiplied by the proportion of homeowners, found by subtracting the proportion of renters (see $(E_H)_F$) from one, to estimate the number of homes that are owned by the colleges' faculty and staff.

The formula assumes that personnel who own their own homes live in facilities of average value. To estimate the assessed value of the average home in Maryland, from which the real estate tax is computed, it is necessary to divide the total assessed valuation of all private residences in Maryland by the total number of residences. (Both of these figures are available from the Department of Assessment and Taxation. [24]) The average assessed value is multiplied by the 1976 State property tax rate which is in turn multiplied by the number of homes owned by college personnel.

b) Business real estate tax.

State businesses paid almost $43,000 in real estate taxes for real property allocable to college-related business. The dollar value of real property due to college-related business, which is found by multiplying the proportion of business volume allocable to the college times the assessed valuation of business property, is multiplied by the tax rate to arrive at this estimate.

$(R_{RE,B})_{CR}$

Real estate taxes paid to Maryland by businesses for real property existing in support of college-related business.

$$(R_{RE,B})_{CR} = (pt)\left(\frac{BV_{CR}}{BV_L}\,V_B\right)$$

$$= (.0023)\left(\frac{\$123,765,004}{\$38,282,022,100}\ \$5,755,276,992\right)$$

$$= \$42,795$$

Variables:

pt = local property tax rate

BV_{CR} = college-related local business volume

BV_L = local business volume

V_B = assessed valuation of local business real property (see RPBCR)

2 - Nonreal property taxes.

Property taxes other than real estate that were paid to Maryland as a result of the community colleges was about $73,000. This includes taxes paid by the colleges' faculty and staff as well as taxes paid by businesses for inventories that exist in support of college-related business.

$(R_{NRE})_{CR}$

College-related property taxes, other than real and State, paid to Maryland.

$$(R_{NRE})_{CR} = (R_{NRE})_F + (R_{NRE,B})_{CR}$$

$$= \$38,953 + \$34,159$$

$$= \$73,112$$

Variables:

$(R_{NRE})_F$ = nonreal property taxes paid to Maryland in-State faculty and staff

$(R_{NRE,B})_{CR}$ = inventory and other nonreal property taxes paid to Maryland by businesses for assets allocable to college-related business

a) Faculty and staff nonreal property tax.

The value of nonreal property taxes paid to Maryland by in-State faculty and staff is estimated to be \$38,953. This assumes college faculty and staff households pay the same proportion of such taxes as other Maryland citizens.

$$(R_{NRE})_F$$

Nonreal property taxes paid to Maryland by faculty and staff.

$$(R_{NRE})_F = F_L \frac{R_{OP}}{T_C}$$

$$= (\$4{,}256)\left(\frac{\$12{,}155{,}691}{\$1{,}328{,}125}\right)$$

$$= \$38{,}953$$

Variables:

F_L = number of faculty and staff residing in Maryland

R_{OP} = total property taxes for other than real estate or inventories paid to Maryland

T_C = total number of households in Maryland

The amount of property taxes for other than real estate or inventories paid to Maryland is calculated from the annual report of the Department of Assessments and Taxation. [24] The number of households in Maryland is calculated by adding the number of households reported in the 1970 Census to the estimated number of new households added since 1970, found by dividing the difference in population from 1970 to 1976 by the average household size. [25, 41]

b) Inventory tax.

Maryland businesses paid about \$34,000 in taxes for inventories allocable to college-related business. Unlike many of the local jurisdictions which do not tax inventories as an inducement to business, Maryland charges the same rate used for real property, 23 cents per \$100 of assessed valuation. The estimate is made by multiplying the tax rate times the college-related inventory.

$$(R_{NRE,B})_{CR}$$

Taxes paid to Maryland by businesses for inventory allocable to college-related business.

$$(R_{NRE,B})_{CR} = (it)\ (I_B)_{CR}$$

$$= (.0023)\ (\$14{,}851{,}800)$$

$$= \$34{,}159$$

Variables:

it Maryland inventory tax rate

$(I_B)_{CR}$ = value of business inventory committed to college-related business

3 - Sales tax.

Maryland received about $1.5 million in sales tax revenue as a result of college-related purchases in 1976-77. The estimate is calculated by multiplying the portion of the total business volume in Maryland that is generated by the colleges times the total sales collected in FY 1977.

$(R_{ST})_{CR}$

Sales tax received by Maryland as a result of college-related purchases.

$$(R_{ST})_{CR} = (ST)\left(\frac{BV_{CR}}{BV_L}\right)$$

$$= (\$465{,}840{,}488)\left(\frac{\$123{,}765{,}004}{\$38{,}282{,}022{,}100}\right)$$

$$= \$1{,}506{,}052$$

Variables:

ST = total sales tax collected in Maryland

BV_{CR} = college-related business volume

BV_L = Maryland business volume

The amount of sales tax collected in Maryland is reported in the Comptroller's Annual Report for FY 1977. [10] The other variables have been used previously.

4 - Income tax.

College faculty and staff paid the State over $2 million in income taxes based on their college earnings. This is calculated by multiplying the proportion of personnel living in Maryland times the amount of total compensation required for State income taxes.

$(R_I)_{CR}$

College-related income taxes collected by Maryland.

$$(R_I)_{CR} = (i_S)\ (f_L)\ (W_F)$$

$$= (.954)\ (.031)\ (\$82,679,618)$$

$$= \$2,445,167$$

Variables:

i_S = proportion of faculty and staff living in Maryland

f_L = proportion of income paid to the State for income tax

W_F = gross compensation paid to faculty and staff

The proportion of income paid to the State for income tax in FY 1977, which is the same as the effective tax rate for all individual tax returns, is based on figures supplied by the Income Tax Division of the Office of the Comptroller of the Treasury. [9] The amount of gross compensation is taken from the annual audit reports of the colleges.

5 - Federal aid to public schools.

Another source of revenue for Maryland is federal aid payments for special functions. This study estimates that almost $300,000 of the total $89 million in federal funds coming into the State for public schools is due to the number of children from college-related families attending public elementary or secondary schools. It is assumed that public school operating costs are directly related to the number of students enrolled.

$(R_A)_{CH}$

Federal school aid allocable to children of college-related families.

$$(R_A)_{CH} = A_{PS}\left(\frac{(CH_{PS})_F}{(CH_{PS})}\right)$$

$$= (\$89,320,390)\left(\frac{2,671}{861,693}\right)$$

$$= \$286,196$$

Variables:

A_{PS} = total federal aid to public schools

$(CH_{PS})_F$ = number of faculty and staff children attending public schools

CH_{PS} = total number of children attending public schools

Enrollment data and the amount of federal aid to Maryland public schools, which includes funds for food service programs, come from the Maryland State Department of Education. [29] Some of the colleges were able to provide the actual number of faculty and staff children in public schools from local survey data. The number for the other colleges was estimated by first dividing the total number of children enrolled in public schools by the number of households and then multiplying this result by the number of full-time faculty and staff. This assumes that each faculty and staff person represents an average household in the local jurisdiction in which he or she lives. The estimates calculated by this procedure were significantly lower than the actual data supplied by college surveys. This suggests the estimate of federal aid that is a result of the children of college-related families is understated. However, there is no hard evidence that households of community college personnel are different from average households or that they are more likely to send their children to public as opposed to private schools.

6 - Federal revenue sharing.

The State also receives aid from the federal government on a per-capita basis. Through one of the newer forms of aid, federal revenue sharing, Maryland received about $140,000 in FY 1977 due to the presence of the colleges' faculty and staff and their families. This amount is calculated by multiplying the number of people in faculty-staff households by the average per capita amount of federal revenue sharing received by Maryland.

$$(R_F)_{CR}$$

College-related federal revenue sharing received by Maryland.

$$\begin{aligned}(R_F)_{CR} &= (FH_L)\left(\frac{R_F}{POP_{LR}}\right)\\ &= (\$13,382)\left(\frac{\$42,033,538}{\$4,170,600}\right)\\ &= \$139,406\end{aligned}$$

Variables:

FH_L = total number of persons in Maryland faculty and staff households

R_F = federal revenue sharing received by Maryland

POP_{LR} = total resident population

The total number of persons in faculty and staff households is estimated by multiplying the number of full-time personnel by the average household size in Maryland. This assumes again that characteristics of people working at community colleges are not significantly different from average Marylanders. The amount of federal revenue sharing for Maryland came from the Office of Revenue Sharing, U. S. Department of the Treasury. The local resident population is based on estimates by the Maryland Department of Health and Mental Hygiene. [25]

How much revenue did the local jurisdictions receive because of the presence of the seventeen community colleges?

The local jurisdictions which support a community college received about $46 million in annual tax receipts, State and federal aid, and other local government receipts derived from the colleges, their faculties and staffs, and the related business activity. (This includes State and federal aid for the colleges, but not student aid.) In 1976-77, the local jurisdictions spent $31,757,244 in support of their local community colleges. Table 1 compares the revenues received by the State of Maryland with those received by the local jurisdictions. In some cases the two figures can be added together for an estimate of the total revenues received by all Maryland governments. The total figures did not include any State aid to the local jurisdiction because State aid from a Statewide perspective is not a revenue. (From a purely local perspective, however, it is a definite benefit or revenue.)

Generally the same formulas used in the State study were used to estimate revenues for the local jurisdictions which support community colleges. The local estimates represent the sum of the individual college estimates. Because aggregate data is used, some of the estimates may appear to be too low in comparison with the State figures. Given the nature of the local piggyback income tax rates, for example, it would seem that the local figure should be about half of the State figure. The reason this does not happen is the variance in residency patterns. Over 90 percent of the personnel from a college may live in Maryland, while only 60 percent live in the local jurisdiction in which the college is located.

How much did it cost the State of Maryland to provide services for the colleges and their staffs?

Maryland spent about $8.8 million to provide services and public schools for the colleges themselves, their employees, and the related business activity. The formulas used to arrive at this estimate emphasize population relationships. The population basis for allocating costs of services to a college area may cause an overestimation of the costs of services to the college by implicitly underestimating the services rendered to business establishments. Businesses are usually capital intensive; and because a college is usually labor intensive, the share of government expenditures will probably be higher than it would be for an industrial installation.

$$(OC_{M,PS})_{CR}$$

College-related costs of State government services.

$$\begin{aligned}(OC_{M,PS})_{CR} &= (OC_{M})_{CR} + (OC_{PS})_{CR} \\ &= \$6,917,484 + \$1,912,234\end{aligned}$$

TABLE 1

MARYLAND COMMUNITY COLLEGES
COLLEGE-RELATED REVENUES RECEIVED BY STATE AND LOCAL GOVERNMENTS

Label	Variable	State	Local	Total
R_{CR}	TOTAL REVENUES RECEIVED	$ 8,977,224	$46,583,793	$11,932,230[4]
$(R_{RE})_{CR}$	College-related real estate taxes	153,282	1,585,659	1,738,941
$(R_{RE})_{C}$	Real estate taxes paid by colleges................	50	1,368	1,418
$(R_{RE})_{F}$	Real estate taxes paid by faculty and staff........	110,437	1,359,086	1,469,523
$(R_{RE,B})_{CR}$	College-related real estate taxes paid by businesses..................................	42,795	225,205	268,000
$(R_{NRE})_{CR}$	Other college-related property taxes.	73,112	224,684	317,796
$(R_{NRE})_{F}$	Nonreal property tax paid by faculty and staff.....	38,953	203,740	242,693
$(R_{NRE,B})_{CR}$	College-related inventory taxes paid by businesses..................................	34,159	40,944	75,103
$(R_{ST})_{CR}$	Sales tax received from college-related purchases . .	1,506,052	-	1,506,052
$(R_{I})_{CR}$	College-related income taxes.	2,445,167	939,866	3,385,033
$(R_{A})_{CH}$	College-related aid to public schools	286,196[1]	1,533,543[2]	286,196[4]
$(R_{F})_{CR}$	College-related revenue sharing	139,406	184,797	324,203
$(R_{F})_{C}$	Aid to community colleges	4,374,009[1]	42,095,244[3]	4,374,009[4]

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[1] Federal aid.
[2] State aid.
[3] Federal and State aid.
[4] State aid to local jurisdictions not included in total figure.

$$= \$8,829,718$$

Variables:

$(OC_M)_{CR}$ = operating cost of government-provided services allocable to college-related influences

$(OC_{PS})_{CR}$ = operating cost of public schools allocable to college-related persons

1 - State-provided services.

The cost of services other than public schools provided by Maryland to college-related personnel and businesses was about $7 million in FY 1977. The allocation of these costs is made on a college-related, per-capita basis. Two components are used in the equation, including the number of full-time faculty and staff at the colleges, and the total number of persons in faculty and staff households residing within Maryland. Each of these components is expressed as a proportion of the total daytime or resident population of the State. They are then added together and divided by two to avoid double counting. This method weights equally the costs of services for commuters coming into the area and for those living and working in Maryland. Because almost all college personnel live in Maryland, assigning different weights would make little significant difference.

$(OC_M)_{CR}$

College-related costs of State services other than public schools.

$$(OC_M)_{CR} = \left(\frac{\frac{F}{POP_{LD}} + \frac{FH_L}{POP_{LR}}}{2} \right) (B_{MS})$$

$$= \left(\frac{\frac{\$4,461}{\$3,970,600} + \frac{\$13,832}{\$4,170,600}}{2} \right) (\$3,115,944,000)$$

$$= \$6,917,484$$

Variables:

F = total number of faculty and staff

POP_{LD} = total State daytime population

FH_L = total number of persons in Maryland faculty and staff households

POP_{LR} = total resident population in Maryland

B_{MS} = Maryland's operating budget except public schools

The daytime population of Maryland is based on Census data and estimates of commuting patterns made by the State Department of Planning along with recent population estimates of the Department of Health and Mental Hygiene. [25] The daytime population tends to be lower than the total resident population because of the number of people commuting to Washington from Prince George's and Montgomery Counties, although some of this outflow is balanced from commuters into the Baltimore area. The operating budget for FY 1977 of the State of Maryland came from the Comptroller's Annual Report and excludes federal funds. [10]

2 - Public school cost.

The State cost of providing public schools for children of college faculty and staff was almost \$2 million in FY 1977. The same logic used to estimate the costs of other State services is used in this formula. The ratio of the total number of college-related children attending public schools to the total number of children attending public schools is multiplied by State expenditures for public schools for an estimate of college-related costs.

$$(OC_{PS})_{CR}$$

State cost of operating college-related public school services.

$$(OC_{PS})_{CR} = \left(\frac{(CH_{PS})_F}{CH_{PS}} \right) (B_{PS})$$

$$= \left(\frac{\$2,761}{\$861,693} \right) (\$596,598,000)$$

$$= \$1,912,234$$

Variables:

$(CH_{PS})_F$ = number of faculty and staff children attending public schools in Maryland

CH_{PS} = total number of children attending public schools in Maryland

B_{PS} = Maryland's expenditures for public schools

The number of children attending public schools and the number of faculty and staff children attending public schools is taken from the revenue formulas used earlier. The operating budget of public schools for Maryland in FY 1977 came from the Comptroller's Annual Report and does not include federal funds. [10]

What is the value of State property related to services provided for the colleges and their employees?

The dollar value of State-owned capital facilities that exist in support of services provided to the colleges and their staffs was estimated to be about $1.3 million. This estimate of related capital facilities does not attempt to state how much capital outlay would be needed specifically to provide those services. That kind of estimate would involve assumptions about the nature of capital investment, the scale of operations at the time the investment is made, and other factors that are not considered in this study. Because the valuation of public property is likely to be considerably lower than its true value or replacement cost, the estimate may be understated.

$$GP_{CR}$$

Value of college-related State property.

$$\begin{aligned} GP_{CR} &= \left(\frac{(OC_M)_{CR}}{B_{MS}}\right)(GP_M) \\ &= \left(\frac{\$6,917,484}{\$3,115,944,000}\right)(\$586,902,000) \\ &= \$1,302,939 \end{aligned}$$

Variables:

$(OC_M)_{CR}$ = operating cost of State-provided services allocable to college-related influences

B_{MS} = Maryland's operating budget except public schools

GP_M = value of all State property except public schools

The estimate is made by multiplying the proportion of State-provided services that are college related times the estimated worth of State-owned property. The value of State-owned property is estimated in the Annual Report of the Department of Assessments and Taxation. [24] Because the State rents facilities to house the State Department of Education and the local jurisdictions own public school property, the amount of State-owned school-related property is negligible, and, therefore, not included in the formula.

How much real estate taxes are foregone by the State of Maryland because of the tax exempt status of the colleges?

The State foregoes at least $22,000 and the local jurisdictions another half million dollars in real estate taxes because the land occupied by the Maryland community colleges has been taken out of the property base. There are two ways an estimate of foregone property taxes can be made. The first would involve estimating the value of the colleges' property at the average unit-area value of property in neighborhoods adjacent to the campuses. One problem in doing this is determining an appropriate market price which would have prevailed in the absence of the colleges. It could be argued that property values in adjacent areas have been positively influenced by the presence of the colleges and that those increases which result in higher tax revenues should be added to the positive contribution of the colleges. The difficulty of determining market values for all of the colleges which are located in both rural and highly urban places made the second alternative for estimating foregone taxes more feasible.

The second procedure is based on an average Statewide unit-area value. The total real estate taxes collected by Maryland is multiplied by the proportion of total land held by the colleges. Real estate taxes paid by the colleges, which are negligible, are subtracted both from the amount of real estate taxes collected by Maryland and from the amount of taxes allocated to college property. The result is probably far too low, but use of the first procedure would require extensive knowledge about the real estate values and local land markets.

$$(RF_{RE})_C$$

Real estate taxes foregone through tax-exempt status of the colleges.

$$(RF_{RE})_C = [R_{RE} - (R_{RE})_C] \frac{G_C}{G_L} - (R_{RE})_C$$

$$= (\$53{,}411{,}568 - \$50) \frac{4.0814}{9{,}970} - \$50$$

$$= \$21{,}814$$

Variables:

R_{RE} = total real estate taxes collected by the State

$(R_{RE})_C$ = real estate taxes paid to Maryland by the colleges

G_C = total geographical area of the colleges

G_L = geographical area of Maryland exclusive of the colleges

The total real estate taxes collected by Maryland in 1976-77 comes from the Annual Report of the Department of Assessment and Taxation. [24] The college facilities offices provided the acreage of their institutions which was translated into square miles. The total square mileage of the State comes from the Maryland Manual. [26]

What were the costs to the local jurisdictions of providing services to the colleges and their faculty and staff?

The local governments have similar college-related costs to the State in the provision of services, in the costs of property existing to support these services, and in foregone real estate taxes. Table 2 compares local costs with State costs. As in Table 1, some of the figures can be added together to get a Statewide estimate of total government costs. This is important since community colleges are a joint State-local venture. The value of local government property may seem high, but it includes all public school property which is extensive. The amount of foregone real estate taxes is also significantly higher but that is due to the tax structure of local jurisdictions that depend much more heavily on property taxes than does the State.

One variable included in Table 2 but not included in the State estimates of government impacts is the value of municipal-type services that were self-provided by the colleges. Institutions such as colleges often provide some of their own sanitation and security services to supplement those offered by local governments. They also may pay for the lighting of some areas, such as streets and parking lots adjacent to their own property, and sometimes maintain or partially maintain public areas with street and walkway maintenance, tree trimming, and other services. The colleges estimated they provided about $1.3 million of these local services in FY 1977.

GENERAL EMPLOYMENT

How many full-time jobs are available in Maryland because of the operation of the seventeen community colleges?

Almost 7,000 jobs in Maryland are attributable to the presence of the seventeen community colleges. This includes the number of jobs provided directly by the colleges and those created indirectly by college-related activities. Additional jobs are created not only in the business sector from expenditures made by the colleges and their employees, but also in the government sector which supplies services.

J_M

Number of jobs attributable to presence of Maryland community colleges.

$$J_M = (j)\ (F)$$

$$= (1.5)\ (\$4,461)$$

$$= \$6,692$$

Variables:

j = employment multiplier effect (see Appendix A)

F = total number of faculty and staff

TABLE 2

MARYLAND COMMUNITY COLLEGES

COLLEGE-RELATED COSTS TO STATE AND LOCAL GOVERNMENTS

Label	Variable	State	Local	Total
$(OC_{M,PS})_{CR}$	College-related costs to governments for public schools and other services.	$ 8,829,718	$ 6,540,713	$15,370,431
$(OC_M)_{CR}$	College-related costs of services other than public schools.........................	6,917,484	3,078,626	9,996,110
$(OC_{PS})_{CR}$	College-related costs of operating public schools..	1,912,234	3,462,087	5,374,321
GP_{CR}	Value of college-related government property.	1,302,939	6,664,880	7,967,819
$(RF_{RE})_C$	Real estate taxes foregone through tax-exempt status of the colleges	21,814	557,026	578,840
$(R_{RE})_C$	Real estate taxes paid by the colleges.	50	1,368	1,418
$(OC_M)_{SC}$	Value of local government-type services self-provided by the colleges[1]	-	1,290,867	1,290,867

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[1] Variable not used in State model.

The employment multiplier effect is based on the same theory that determines the expenditure multiplier. For an area the size of a state, 1.5 is considered to be an acceptable, if conservative, range. (See Appendix A.) The multiplier is multiplied by the number of faculty and staff, which include all full-time personnel at the colleges in 1976-77, for an estimate of the total number of jobs in Maryland that exist because of the colleges.

PART I: ECONOMIC IMPACT OF EXPENDITURES

CONCLUSION

The major impact of Maryland community colleges is still definitely related to the principal mission of higher education. Education and training provided by the colleges increases students' potential earning power and enriches their lifestyles. In fulfilling the primary mission, the colleges assume many diverse roles. The study shows that the seventeen community colleges utilize several resources from the local communities and the State, while contributing resources of their own. The faculties and staff who are employed by the colleges also are active participants in the economic life of the State. The community colleges of Maryland are not only an excellent educational benefit, but also a solid economic advantage to their communities and the State.

PART II: HUMAN CAPITAL INVESTMENT

CHAPTER I

Education is one way that people invest in themselves. By paying some costs in the present, they can generate greater returns in the future. As the term "human capital" implies, individuals have certain capacities or skills of a cognitive, physical, social, or psychological nature with which they earn a living. Higher education is capable of teaching a person general facts, the use of specific tools, and general problem-solving techniques. Higher education also can influence a person's behavior by making him more tolerant of diversity, better able to stand stress, a better leader, and mentally more disciplined. All these factors could make a person a more productive and effective worker and, therefore, able to command a better income.

There has been considerable study and much controversy about how education and earnings are causally linked. While there may be some doubt as to whether education is a sufficient condition for obtaining a higher paying job, it does appear to be a necessary catalyst for at least the majority of the population.

Economists have known a long time that people are an important part of the wealth of nations. But what many have failed to examine is the simple truth that people invest in themselves and that these investments are very large. Many paradoxes about a dynamic economy can be resolved once human investment is taken into account.

How are human capital investments measured?

Three approaches have been used to quantify the impact of human capital.

Often a simple correlation is made between some measure of educational activity and an index of economic activity. For example, enrollment ratios have been correlated with GNP per capita, indicating a positive relationship. However, this fails to show cause and effect relationship.

The "residual approach" assesses the total increase in the economic output of a region for a period of time, measuring the impact of identifiable inputs and then attributing the residual to unidentifiable inputs, the most important of which is human capital.

The third approach, which is used most often in human capital research, contrasts the future lifetime earnings of people with less education with people that have greater educational attainment. The rate of return method seems to be the most precise because it relates not only benefits but also costs.

To calculate a rate of return, it is necessary to know how much education costs, how much the college educated earn compared to those without a college education, and how much those future earnings are worth today. The comparison of these costs and benefits results in a measure of human capital investment.

How are future earnings estimated in terms of today's value?

"Present values" are obtained from expected future values by a method economists call discounting. This concept is as important in the financial world as it is in the economist's theoretical world. Prospective purchasers of any asset have their eyes on future income or increased wealth from the ownership of the asset. Their demand for the asset reflects their estimate of the total future earnings. That is why, for example, the stock of a corporation that is not earning any net income now may still sell for a high price. It is also the reason that some people invest in education even though there may be a net loss in the present or immediate future.

Wealth in the future, however, is not worth as much as wealth now. Consider the investor that can ordinarily earn 10 percent on his money. For him, $110 a year from now is worth only $100 now. To determine the present value he discounts future wealth at the rate of 10 percent. He divides $110 by 1.10 (1 plus 10 percent) to obtain the present value of $110 a year from now.

Money available today can begin to pay dividends immediately, while money available in the future cannot. Even though a person with higher education may be able to earn more than someone with less education when he is in his forties or fifties, he might have come out ahead if he had continued working and invested his money in a certificate of deposit.

The same theory is used to determine present value from any point in the future. For example, how would our investor determine the present value of $100 four years from now? The present value of $100 received four years from now is $100 divided by 1.10 to the fourth power (1.4641) which works out to about $68.30.

The following is an example of how discounting works in making an investment decision and why present values are necessary.

Joe Jones has $10,000 which he can invest in a savings account that earns 10 percent interest a year. He could also buy into a new company with anticipated net revenues of 0 the first two years, $1,500 the third year, $2,000 the next two years, $2,500 the sixth, seventh, and eighth years, and $4,000 the following two years. Profit becomes negligible past that point.

At first glance, by adding up the profits, it would appear that Mr. Jones would receive $21,000 return on his $10,000 investment, which would be greater than the return from the savings account. But the $4,000 he earns in 10 years is not worth as much to him as it would be if he could invest it now. By estimating the present value of those net revenues, he can decide if he should invest his money in the new business.

The discount rate used is the best interest available in a guaranteed investment, which for Mr. Jones is 10 percent. The present value of the net gains is $10,834, which is only slightly greater than his initial investment of $10,000 and significantly less than he could earn by putting his money in a savings account. Part of the reason for this is the low returns early in the life of the investment. Had he earned $4,000 after the first or second year of operation, the results would have been significantly different.

The concept of present value is important because human capital benefits accrue over a lifetime. It is necessary to know the present value of increased earnings due to education during a person's entire productive lifetime.

It would seem to be a lot easier to just add all earnings differentials instead of going through the complicated discounting procedures. That sum, however, would not mean very much to the student thinking about making an investment in education or a government trying to assess costs and benefits. Just as apples and oranges cannot be added together, dollars from different years cannot be added together without distorting the results and overestimating true values.

What are the costs of human capital investments in education?

The costs of education can be divided into two categories. First, there are the direct costs of salaries, supplies, buildings, and student tuition and fees. Then there are indirect or opportunity costs that take the form of foregone student income or foregone tax revenues.

Many researchers feel that foregone income is the primary cost of direct and indirect expenditures in education. This is the income that a student could have earned if he worked full-time rather than attend school. From society's point of view, foregone income reflects output that is not being produced because a potential labor source has been withdrawn from the labor market.

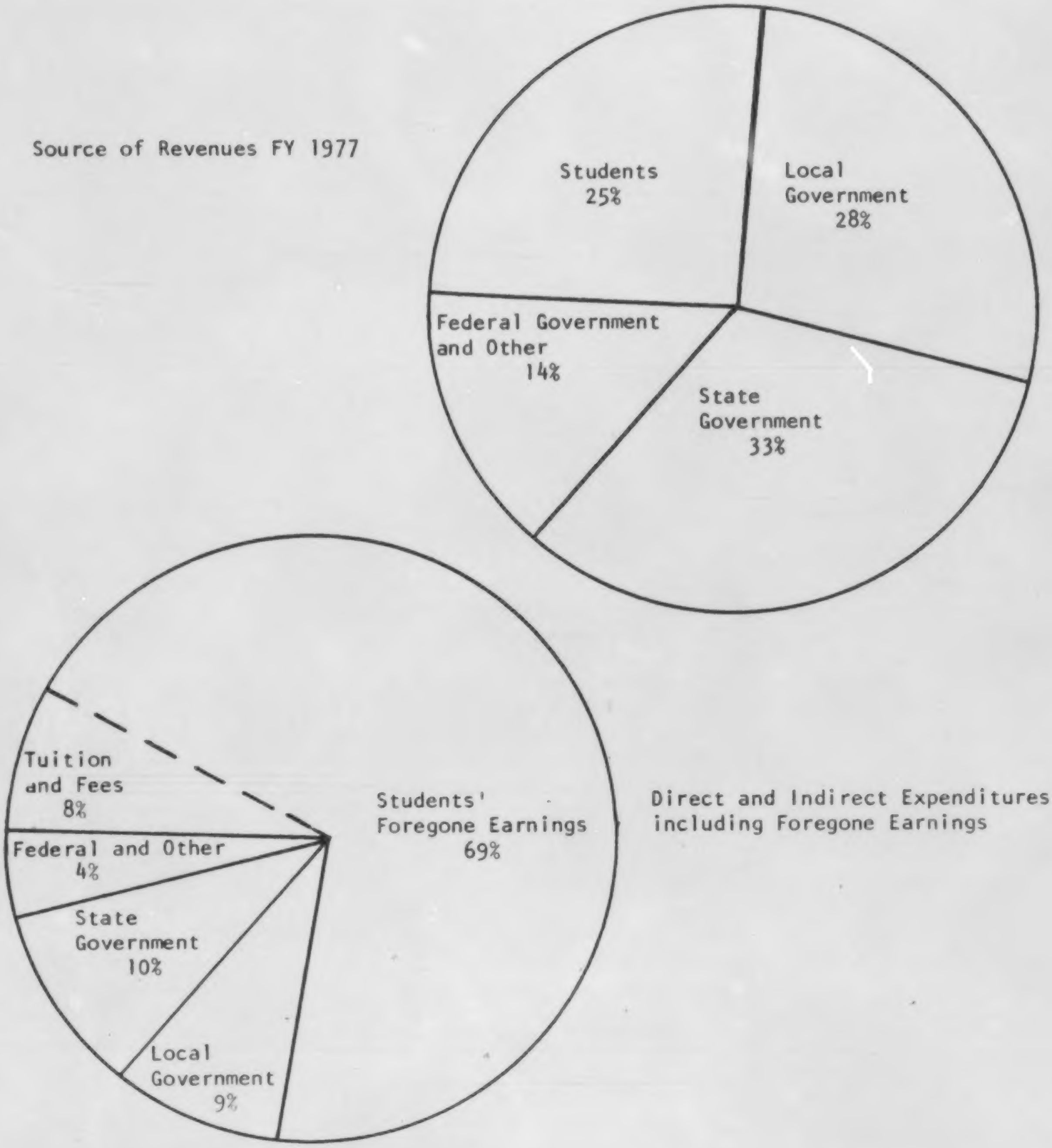
It is true that the foregone earnings cost is not out-of-pocket, but it does impose a financial sacrifice, particularly on low income families. Illustration 2 indicates how the inclusion of foregone earnings shifts the major burden of financing education from the public to the individual and his family.

What are the benefits of human capital investment in education?

On the plus side of the question is the increased productivity that comes as a result of education. The main measure of this productivity is the higher earnings students get because they attended college. This study was interested in the difference in earnings between high school graduates and those with some college education. Students can also receive benefits in the form of financial aid or scholarships while they are in school. Society as a whole benefits from the increased productivity as well as the greater tax revenues from the increased wages.

ILLUSTRATION 2

MARYLAND COMMUNITY COLLEGES
IMPACTS OF FOREGONE EARNINGS



Source of Revenues FY 1977

Direct and Indirect Expenditures including Foregone Earnings

What is the difference between social human capital as opposed to private human capital?

When looking at private human capital investments, only factors affecting the individual are considered. On the cost side are tuition and fees, books and supplies, and foregone earnings. On the benefit side are financial aid and the present value of earning differentials. This is the same information that a student probably uses in making his decisions about whether or not he wants to go to college, where he wants to go, and what will be his future benefits. It does not consider other noneconomic factors which may for some people be more important than the economic ones.

The social human capital model takes into account all costs and benefits to society as an economic entity. To the student costs are added the public costs of subsidies to higher education. For Maryland community colleges the largest portions are contributions from the State and local governments. The final figures reflect the value of the increased productivity on society as a whole.

What do the numbers mean?

There are two ways of calculating human capital investments. One is to simply estimate the present value of all the costs and compare it with the present value of all the benefits. This results in a dollar amount that can be compared with other investments. Much depends on the discount rate selected since a high rate will yield lower returns than a low rate. This is illustrated by going back to the example of the investor who was computing present values of $100. The present value of $100 a year from now at a 10 percent discount rate is $90.91. If a 5 percent discount rate is used, the value would be $95.24. For investments that stretch out for long periods of time, such as education, this can have a huge impact.

Another way of looking at human capital investment is by computing the "internal rate of return." Instead of the discount rate being selected because of present market conditions or common assumptions, the discount rate is computed. In the first method, that amount becomes 0 and the unknown in the equation is the discount rate. This is used more often because it allows comparison with those investments which have a guaranteed rate of return. For example, this study estimates that a woman who is unemployed and attending a community college full-time can expect a 5 percent return on her investment in education. Although she probably could get a better return if she worked and invested the money spent on tuition, fees, books, and supplies, she may feel that the noneconomic benefits combined with the expected economic benefits make higher education worth her time and expenditures.

SUMMARY OF HUMAN CAPITAL IMPACTS

How much more money in present dollars will a Maryland community college student earn during his or her life than a high school graduate?

On the average, a student will earn between $4,346 and $17,345 more, depending on the assumptions made and the discount rate selected. In computing these amounts, costs include the amount the student spends for tuition and fees, books and supplies, and foregone earnings. Benefits are the difference in earnings between a high school graduate and a person with less than three years of higher education. The first number is a more conservative estimate that was computed with a 10 percent discount rate. The second used more liberal assumptions, including a 5 percent discount rate, a 3.5 percent growth rate adjustment, and an ability factor of 15 percent as opposed to 25 percent.

How much more money in present dollars will be earned by Maryland community college students enrolled in college in the Fall 1976 semester because of the total investment by the State of Maryland, the local jurisdictions, and the students themselves?

The social human capital model which takes into account all costs and benefits to society as an economic entity, is used to answer this question. The present value of the increased earnings from community college students attending schools during the 1976 Fall semester is between $236.7 million and $1,230.7 million depending on the assumptions made and the discount rate used. To calculate these figures, the social returns for individuals had to be computed. The average social returns accrued by each student, including full- and part-time students, ranged from $3,078 to $16,008 depending on the assumptions. This amount was then multiplied by the total number of students attending a Maryland community college during the 1976 Fall semester.

What is the present value of the additional State and local tax revenues generated from the increased earnings?

The present value of the additional taxes the State and local governments will collect on the increased earnings of community college students is between $25.2 million and $77.6 million depending on the assumptions made and the discount rate used. The cost side of the equation was primarily the amount of foregone taxes the State and local jurisdictions did not receive for those students who were either unemployed or employed part-time. The tax differentials which made up the benefits were calculated by multiplying the earning differentials by 5.6 percent, which is an estimate of the average fraction of personal income paid in State and local taxes, exclusive of the property tax.

How much money did Maryland and the local jurisdictions invest?

The total contribution from State and local sources in FY 1977 was $68,316,884 for credit enrollment, including restricted and unrestricted funds. A little over $55 million was spent for operating or unrestricted expenditures for credit enrollment.

What was the internal rate of return for Maryland community college students in FY 1977?

The average community college student who attended college during the 1976 Fall semester will receive almost a 27 percent return on his or her investment in higher education during a lifetime. The percentages are widely varied according to the status of the students, whether they were full- or part-time, employed or unemployed, male or female. The internal rates of return range from 3.6 percent for part-time female students who were unemployed while in college to more than 100 percent for full-time male students who were employed full-time while in college. Two major reasons for the disparities in the rates of return were the foregone earnings of the unemployed students, and the tendency for women to drop out of the labor force during some part of their careers. Women who do not interrupt their work careers can expect returns similar to those of men.

What was the internal rate of return for the social investment made by the public and the students in FY 1977?

The average rate of return for the social investment in an individual is almost 15 percent for Fall 1976 students. The same method used to determine the present value of the total social investment was used to calculate the social return. First, the individual social rate of return was computed from which the systemwide average was determined. The social rates of return for the different kinds of students ranged from 2.4 percent for part-time female students who were unemployed while in college to 45.8 percent for full-time male students who were employed full-time while in college.

PART II: HUMAN CAPITAL INVESTMENT

CHAPTER 2

Studies of human capital investment in higher education have, for the most part, dealt only with the economic costs and benefits. Calculation of rates of return on an investment in education, however, fail to include both external benefits accruing to society at large and nonpecuniary benefits accruing to the individual. Although the omitted items are difficult to measure, they may take on more significance in the future. For example, higher education appears to make important contributions to the quality of citizen and community responsibility, and provides access to a range of options and opportunities that might otherwise be closed off to certain people. In addition, increased education may narrow the gulf in understanding between people of different backgrounds. Another important benefit can also be the reduced transfer payments for welfare, unemployment compensation and related programs which go heavily to the less educated.

The distinctive characteristic of human capital is that it is a part of man, and it is a source of future satisfactions, or of future earnings, or both. Human capital can be acquired only by investing in oneself; it cannot be bought in a market place. The concept of human capital investment in education was recently addressed in a Colorado courtroom. In a divorce case, a district court determined that the wife had contributed 70 percent of the couple's financial support while they were married. The judge ruled that she was entitled to joint ownership of her husband's master's degree in business administration which he had earned during the marriage. Based on an estimate of the man's increased earning potential, the trial court awarded the woman some $33,000 to be paid in installments of $100 per month. The Colorado Supreme Court reversed the decision by a 4 to 3 vote saying that an educational degree is not encompassed by the concept of "property." The three dissenting judges, however, declared that the woman's earnings during the marriage had not only provided her husband's support, but also had been "invested" in his education to enable him to have the time and funds necessary to obtain his education. [19]

If higher education is to be considered an investment, there should be some way the investors, individuals and the public at large, can gauge its effectiveness. This is what the human capital models try to do. They do not take into account all the benefits to society or the individual, but neither do they measure all the costs, such as the support of the woman mentioned above.

The actual calculation of the value of human capital on the surface is very straightforward. All the costs are subtracted from all the benefits. However, it becomes more complex when present value must be considered and the actual costs and benefits are listed. What are all the costs? Which benefits should be included? This study also deals only with community college education as compared to the majority of the studies which deal with the traditional four-year students. The following pages will explain the rationale behind the numbers in Part II, Chapter 1. The remainder is divided into three main sectors: Private Investment, Social Investment, and Added Taxes.

PRIVATE INVESTMENT

The private human capital investment models compare only those costs and benefits which accrue to the individual. Costs borne in the public sector for subsidies for institutions or financial aid for students are omitted. Most studies have found that individuals do very well from an economic point of view from their investments in higher education. Recent studies "make it appear highly probable that the rate of return for individuals who did complete two-year programs was actually higher than the rate of return for four-year graduates." [33]

The cost side of the equation will be discussed first followed by an explanation of how benefits are calculated. The numbers will then be used to estimate both the present value and the internal rates of return of community college education.

What are the costs of higher education?

The first cost that comes to mind when an individual is trying to decide whether or not to go to colleges is the amount of tuition and fees different kinds of colleges charge. One of the major advantages of Maryland community colleges is their low cost. The State Board for Higher Education estimates that the average yearly tuition and required fees for full-time, in-State community college students is $430 at public two-year colleges in Maryland. [27] This takes into account all the tuition rates and fee schedules of the seventeen institutions. (The same figure for public four-year colleges in Maryland was $767, and for comprehensive public universities, $774.)

Most studies in this field have been concerned only with the full-time student. Because of the nature of community colleges and the recent trend toward increasing numbers of part-time students, this eliminates an important segment of the community college population--in Maryland's case more than 60 percent of the student body in FY 1977. One way to allow for this is to use full-time equivalent (FTE) figures, but this ignores important differences in full- and part-time students especially when foregone earnings are added to the costs. For this reason, this study treats the part-time population differently from the full-time population. The average yearly tuition and fees for part-time students is estimated to be half the full-time rate, or $215.

Books and Supplies

Another related cost to students is books and supplies. Different studies have used estimates ranging from $50 to $400 per year. A widely quoted study by Hansen and Weisbrod estimated the cost for books and supplies to be about $150 in 1965. [15] This study estimated that about $25 is spent per three-hour course to total $300 for full-time students, and $150 for part-time students.

Credit Hours Taken

The next problem is to gauge the length of time community college students in Maryland attend school. The low percentage of graduates as compared to the total student population indicates many students may not attend college for two years. The State Board for Community Colleges *Student Follow-Up Study: First-Time Students Fall 1972* [37] shows that the mean credit hours earned by the average student was 33.2, down from 34.0 the previous year. This indicates that the average full-time student attends about one year, while average part-time students attend two or more years. Based on this estimate, the amounts for tuition and fees, books and supplies appear only in the initial year of the cost stream for full-time students, but in the first and second years for part-time students. These assumptions may cause an overstatement or understatement of returns on educational investments, but using Follow-Up figures is probably more defensible than assuming all students complete 60 credit hours.

Room and Board

Costs for room and board are not included for several reasons. First of all, even if students do not opt to attend community college, room and board costs would still be incurred. There is no reason to believe that room and board costs of students are any higher than for anyone else, and therefore these costs are not really related to the college investment. Secondly, none of the seventeen community colleges in Maryland provide dormitory facilities. Therefore, there is not an artificial inflation of room and board charges that might occur in a resident institution.

Transportation

A real cost for students, especially because they are commuters, is transportation and travel time. These costs were not included because of the difficulty of making accurate estimates. It is impossible to gauge on a systemwide basis distance traveled, cost per mile, and whether or not public transportation was used. Most studies on the value of travel time provide contradicting guidelines as to the value of that time. The omission of these costs probably causes an inflation of the final results.

Foregone Earnings

The primary cost to students is the opportunity cost of foregone earnings. This is the income that a student could have earned if he or she worked full-time rather than attend school. The illustration on page 52 illustrates how the inclusion of foregone earnings shifts the major burden of financing education from the public to the individual and his family.

Foregone earnings are often a neglected cost of investment in human capital, but they should be treated as indirect outlays. This includes the difference between what could have been earned and what actually is earned. The amount foregone depends on the number of hours spent for college activities and at work, and varies with the person's age, sex, and educational level.

Some have suggested that it should not be included because the foregone income of houswives or voluntary workers is not included in the benefit side of the equation. Most economists in this field (Becker, Hansen and Weisbrod, and Schultz, among others) feel that earnings foregone by students make up well over half of the real costs of human capital formation in higher education. [3, 15, 34] Foregone earnings may be just as important as lack of information and motivation in explaining why low-income high school graduates do not attend college.

Once the decision has been made to include foregone earnings, the next step is to estimate their value. The Student Follow-Up Study [37] was used to estimate the amounts for both unemployed and part-time employed students. A breakdown program was used to find mean earnings by sex and by whether the student was employed full- or part-time. The major drawback to using this data is that the earnings reported were not earnings made while the students were in college. Instead, the figures show how much students made upon leaving the college for those students who were employed during college. This may overestimate the amount of foregone earnings because a high school graduate in the same job might have not earned as much as the employee attending college. However, the follow-up data is probably the most accurate information available.

There is one other drawback in assigning all students who were unemployed during college the cost of foregone earnings because it does not allow for the students who are enrolled for self-enrichment or other noneconomic reasons. However, the use of labor force participation rates alleviates much of the problem. The amount of foregone earnings by sex and employment status is shown in Table 3.

Age

The age of students is important for several reasons. First of all, it is necessary for determining the starting point of the cost-benefit stream. In the section on benefits, the effects of age on earning differentials will be discussed more fully. Secondly, a person's age is an indicator of how likely he or she will participate in the labor force. The median age of credit students by sex and student status for the Fall of 1976 is determined from HEGIS data supplied by the State Board for Higher Education. (See Table 4.)

Labor Force Participation Rates

The use of labor force participation rates is important in the consideration of both foregone income and future earnings. If a person attends college because he cannot find a job, then he is not foregoing any earnings. For example, when the country was in a serious recession in 1975, enrollment in colleges and universities was far above all expectations for the Fall term. To adjust for this factor, the amount of foregone earnings is multiplied by the labor force participation rate as projected by the Maryland State Planning Department for 1976. [30] (See Table 5.)

Both the age and sex of a person is an important indicator of the likelihood he or she will be in the labor force. For example, the median age of

TABLE 3

MARYLAND COMMUNITY COLLEGES
PRIVATE COST FACTORS

Student Status	Age	Foregone Earnings			Years in College	Financial Aid	Tuition and Fees	Books and Supplies
		Employed Full-time	Employed Part-time	Unemployed				
Male								
Part-time	27	0	$3,526	$7,781	2	0	$215	$150
Full-time	20	0	3,526	7,781	1	$250	413	300
Female								
Part-time	28	0	3,394	7,014	2	0	215	150
Full-time	20	0	3,394	7,014	1	250	430	300

Sources: State Board for Higher Education, *Maryland Community Colleges Student Follow-Up Study: First-Time Students Fall 1972, Third Annual Desegregation Status Report for Public Postsecondary Education in Maryland.*

TABLE 4

MARYLAND COMMUNITY COLLEGES

AGE OF CREDIT STUDENTS
FALL 1976

	Male		Female		
	Full-time	Part-time	Full-time	Part-time	TOTAL
Percent 20 or younger	45%	12%	54%	15%	27%
Percent 30 or older	9	33	10	41	27
Median Age	20	27	20	28	24

Source: SBHE S-9

TABLE 5

LABOR FORCE PARTICIPATION RATES[1] IN MARYLAND

Age Groupings	Sex	
	Male	Female
20-24	82.9	47.1
25-34	94.7	36.0
35-44	94.8	46.8
45-54	93.6	53.5
55-64	83.8	38.0

[1] Estimates for 1976.

Source: Maryland State Planning Department, *The Labor Force of Maryland: Projections of Socioeconomic Characteristics to 1980* (Maryland State Planning Department, 1970).

full-time males is 20, while the median for part-time males is 27. In Maryland, 82.9 percent of men aged 20 to 24 are in the labor force, as compared to 94.7 percent of those aged 25 to 34. For full-time students, the amount of foregone earnings for those employed part-time or who are unemployed would be multiplied by 82.9 percent, while the amount of foregone earnings for part-time students would be multiplied by 94.7 percent.

In Summary

To summarize, the costs include the annual tuition and fees, the average costs of books and supplies, and the amount of foregone earnings for students who are employed part-time or who are unemployed. Full-time students attend school about one year, while part-time students go an average of two years. Therefore, the cost stream for full-time students is terminated after the first year, while the cost stream for part-time students ends after the second year.

What are the benefits?

One benefit to individuals that accrues while they are in college is in the form of financial aid. If the student were not in college, the aid would not be "earned." Therefore, average aid payment to community college students in FY 1977 can be subtracted from the cost stream.

Most of the aid payments, both from the State and federal governments, go to full-time students. At the time of this study, the methods for allocating aid were not set up for part-time students even though they represent a growing proportion of the total student population in all segments. For this reason, financial aid benefits are included only for full-time students.

The total amount of financial aid is computed for each college from the *Third Annual Desegregation Status Report for Public Postsecondary Education Institutions in the State of Maryland* which includes Federal Basic and Supplemental Educational Opportunity Grants and State scholarships and grants for community college students. [28] Federal or State loan monies are omitted from the computations. The amount of aid is then divided by the number of full-time students enrolled in Maryland community colleges in the Fall 1976 semester for an estimate of the average grant per student. (See Table 3.)

Earning Differentials

The major economic benefit of higher education to the individual comes in the form of higher earnings. Whether or not the difference in earnings reflects actual increases in productivity is immaterial to the person making the investment from an economic viewpoint. The difference in lifetime earnings between a high school graduate and a person with less than three years of college is used to measure the increased earnings of students attending community college.

The main source for this kind of data is the 1970 Census which provides the most recent and comprehensive data base available for the estimation of educational rates of return. [40] The 1970 data includes more detailed breakdowns than any of the preceding censuses. Age by income distributions are available for high school and college graduates and also for individuals completing one and two years of college (combined). Minor adjustments were made using the Consumer Price Index (CPI) to update the data to FY 1977, although the actual differentials were not significantly affected.

The main drawback to using Census data is that it reports income rather than earnings. Earnings figures theoretically are preferable, but earnings data from the Census is not broken down in sufficient detail, nor is it available from any other known source. Use of income rather than earnings could result in a significant over-statement of returns if income differentials between educational categories are much larger than the corresponding earnings differentials.

However, studies have shown that the Census tends to under-report all types of income with the bias being greater for property income as opposed to wages and salaries. One study concludes that aggregate earnings are about equal to the total incomes reported by the Census and the under-reporting of earnings just about offsets the inclusion of property and other "unearned" income. At the aggregate level, then, Census incomes can be used to measure true earnings. Although property income would be a larger percentage of total incomes at higher age and education levels, the under-reporting of earnings probably also rises with age and education. Therefore, the unadjusted data may not greatly overestimate earning differentials between different levels.

The problem with obtaining income data broken down by age and education level is the main reason analysis college-by-college is not attempted in this study. By using aggregate data for Maryland, a fairly good picture of the returns for a Maryland community college student can be drawn. Another factor that made a State study more feasible is the tendency of students to migrate from the area. From an individual's point of view, the investment can be taken wherever he goes. From the public's point of view, the social investment is lost if a person leaves the area. Migration trends indicate a person is more likely to remain in the State even if he leaves a county or region of the State. Therefore, over a long period of time the State as a whole will capture the benefits of greater productivity from a larger proportion of those attending community college.

Several studies indicate that income differentials for people over 60 years of age have no discernible impact on the rates of return. [17] For this reason, the income streams for this study are arbitrarily truncated at age 64. (The present value of the income differential for community college students in their 65th year at a 10 percent discount rate is less than $15.) Returns also are not adjusted for mortality because previous studies have found that the mortality adjustment has virtually no impact on the rates of return. [17]

The long payoff periods have a definite effect on the rate of return on a college education. Life cycle characteristics are important, particularly in measuring returns on community college education. Earlier, the importance of knowing the median ages of students was discussed because of the effect on the "benefit stream." The Census data supports the intuitive knowledge that people in their 30's and 40's make more than 20-year-olds just entering the labor force. This is due not only to experience but also to salary increases pegged to length of time worked.

The average part-time student who enters college when he is 27 (or 28 for women), will probably make more upon leaving college than the average full-time student who is about 20 years old. This is because the older student is compensated for the experience gained before entering college. The older student, then, receives higher returns earlier in the benefit stream than the younger student. This is important when using present value because those higher returns are less affected by the discount rate. Earning $2,000 more a year now is more significant than making $2,000 more ten years from now. Even though the older students have a shorter benefit stream--in this case seven or eight years--the present value of their earning differentials may actually be higher than younger students who work longer.

The equation would appear now to be complete. The costs have been enumerated, the differentials determined, and the time span described. However, other factors which affect the rate of return must still be taken into account, such as income growth, ability, unemployment, and the selection of a discount rate.

Growth in Income

The estimation of an educational rate of return begins with a cross-section distribution of income differentials by age. The rate of return can be calculated directly from this distribution, or the differentials can be adjusted by applying a growth rate that captures anticipated inflation or productivity increases. Studies have shown that the use of income averages by age based on the cross-section surveys produce lower values than would be obtained by using averages based on successive censuses. [31] This indicates that some allowance for growth rates are probably in order.

Rates of return are compared either implicitly or explicitly with rates from alternative investments. If these investments do not include inflation or productivity increases, then the educational rate should be calculated from the raw data. However, this is highly unlikely. Market interest and profit estimates do include these two factors, and these are the most likely investments that invite comparison. In this study, both raw data and data adjusted for income growth are used.

Based on current conditions and historical evidence, it is assumed that money incomes will grow at a rate of 3.5 percent in the future, which is somewhat conservative during this time of rapid inflation. The use of raw data implies that the earning differentials remain unchanged in absolute amount over time, which is questionable.

The adjusted data includes a 3.5 percent increase in the differentials each year. This implies that the ratio of high school to college income will remain constant at the Census level through the period covered by the income projections. In using the results from this study, the figures from equations using adjusted data are probably more comparable to market rates than the unadjusted "raw" data.

Ability Adjustment

Variables other than educational attainment can affect the differentials in average earnings. The income differences between educational categories, for example, are likely to overstate the effect which education has on income since those with more income are likely to have greater ability. The extent of the effect of ability is difficult to determine, though many have tried. Some argue that it is extensive, while others feel that too much importance has been attributed to it in human capital research. There is also some question if the conventional tests of ability reliably measure the talents required to succeed in the economic world.

Most researchers agree, however, that ability does determine some degree of a person's success. The person with higher ability is not only likely to make more money than his peers, but also is more likely to pursue higher education. To account for ability differentials, the income differentials between all education categories are reduced by both 15 and 25 percent. Because these adjustments are made for the initial as well as later years, the adjustments should capture the noneducation elements which affect income differentials.

Employment Rates

Not everyone who attends a community college will be employed. According to Maryland statistics, the employment rate varies with a person's age and sex. (See Table 5.) To allow for those students who do not enter the work force for any reason, the differentials are multiplied by the labor force participation rate by age group. There also was no attempt to identify those students who transferred to a senior institution. The income data indicate that they would probably make more by further investing in themselves, but this study is only interested in the additional income the average student could expect from community college education.

Despite changes in attitudes and levels of acceptance, women continue to have low participation rates as compared to men. This is probably why most studies in human capital have looked only at male students, making only broad generalizations about female students. This may also explain the reason economic benefits are couched primarily in terms of increased earnings, and why a measurement of the economic value of a woman's contribution outside the traditional work force has yet to be developed.

This omission may be shortsighted, however. According to an article in the January 9, 1978 *Chronicle*, women accounted for 93 percent of enrollment gain in 1977, and actually outnumbered men among 18- and 19-year-olds on campus. [23] It is important that future studies of human capital investment include women.

Statistics show that women still are likely to drop out of the labor force during part of their careers. Since there is no concrete evidence that women attending community colleges in Maryland are significantly different from Maryland women in general, it was assumed that they display the same propensity to enter or leave the work force.

The results for women in this study estimate the return the average woman can expect if she participates in the labor force an average amount of time. The woman whose career is uninterrupted, however, can probably expect a return that more closely represents that of a male student. If more women stay in the labor force than the statistics now show, the average returns will be higher than those reported below. At this time it is difficult to predict if the 20-year-old woman today is more likely to be employed when she is 35 than the average 35-year-old today.

By multiplying the earnings differentials by labor force participation rates, the rates of return may have been understated for both men and women. For example, statistics have consistently shown over time that college-trained people are less likely to be on unemployed and welfare rolls than those with less education. The U. S. Bureau of Labor Statistics admits that information on job placement of community and junior college students has been scarce. However, since community colleges are usually local and draw both students and financial support from a very small area, the Bureau has found that the college programs are designed to fit the community. [42] Therefore, career programs tend to be formulated around manpower requirements of the local area and as a result, students generally have little difficulty in job placement.

There has been a change in demand for college-trained personnel that cannot be ignored. The demand for well-educated persons began in the 1930's because of a shift in government and business toward complicated hardware and systematic research. However, this demand has slackened in some areas as the market was saturated by too many college graduates, resulting in falling salaries and scarce job opportunities. The emphasis of community colleges on career programs and their close cooperation with community businesses and manufacturers in designing new programs has made job hunting less a burden for their students. Some researchers are even speculating that rates of return for community college students will soon exceed, if they do not do so already, those for graduates of four-year colleges.

In addition, although the value of education as it relates to work has been questioned, its value for employment is more apparent. The more educated person in the job market still seems to receive preferential treatment from employers. Whether this is justified is irrelevant if the market place responds in this manner.

If indeed the community college student is better able to get a job and is more likely to be in the labor force than the average work, then the rate of return will be higher than indicated in this study. However, this study attempts to estimate the average return that can be expected from the average student. When more concrete data is available to document the trends today, employment rates will play a less significant role.

Taxes

Many studies reduce the income figures further to allow for taxes. This study counted taxes as any other expenditure, such as housing. It is not clear why they should be excluded except that the individual has little, if any, control over the expenditure. However, when an applicant applies for a job, he is not told the salary is $7,500 if indeed it is $10,000 even though he will pay about 25 percent of his income in direct and indirect taxes. The present value of taxes the State and local governments can expect from the increased earnings of students will be discussed later.

Discount Rates

Once the benefits have been determined and all factors taken into account, the present value or the internal rate of return is ready to be calculated. In determining the internal rate of return, the main concern is finding a discount rate which makes the earning differentials equal to the costs incurred in obtaining an education. It should be remembered that these estimates are essentially averages and not marginal rates of return; they do not answer the question of whether more or less should be invested in education. In the equations below, the present value (PV) would be assigned a value of zero, and the problem solved for (i). Mathematically this is very cumbersome, but the computer can calculate it in a matter of seconds.

In determining the acutal present value of additional earnings, a discount rate, or (i), is selected according to prevailing market conditions. There is much disagreement on precisely what discount rate is most appropriate for calculating present values. Some advocate using discount rates as low as 2 or 3 percent, while others argue for 10 percent or more. The standard rate for evaluating public investments is at least 5 percent. In this study, both a 5 percent and 10 percent discount rate are used. The selection of the 5 percent rate makes comparison with similar studies easier, and many would argue that it is the most reliable based on historical data. However, with today's inflation and the high interest returns available for long-term investments in the money market, 5 percent seems somewhat low, while 10 percent seems to better reflect actual conditions. The answer may actually lie somewhere in between. In determining the present value from the equations below, .05 or .1 is substituted for (i) and the equation solved for PV. Again, the computer simplified this task.

Private investment equations:

Part-time students

$$\frac{-TF-BS-e(FG)}{(1+i)^1} + \frac{-TF-BS-e(FG)}{(1+i)^2} + \frac{(1-a)(e)(ED)}{(1+i)^3} + \ldots + \frac{(1-a)(e)(ED)}{(1+i)^n} = PV$$

Full-time students

$$\frac{-TF-BS-e(FG)+FA}{(1+i)^1} + \frac{(1-a)(e)(ED)}{(1+i)^2} + \ldots + \frac{(1-a)(e)(ED)}{(1+i)^n} = PV$$

TF = Tuition and fees
BS = Books and supplies

e = Labor force participation rate (employment rate)
FG = Foregone earnings
FA = Financial aid
i = Interest rate
a = Ability adjustment factor
ED = Earning differential between high school graduate and person with less than three years of college
PV = Present value of community college investment

What are the private returns for investments in community college education?

Several factors play major roles in determining the returns of an investment in community college education. First of all, whether or not a person is employed while he goes to school makes a significant difference in the present value of his return and on the internal rate of return. The fact that Maryland women tend to participate less in the labor force also is a significant factor. The other variable which plays an important role in the return rate is the low tuition and fees charged by Maryland community colleges.

Because the values for all the factors had such a wide range, the population was divided into subgroups and variables adjusted according to different assumptions. (See equations.) First of all, students were divided by sex, by whether they attended college full- or part-time, and by whether they were unemployed or employed full- or part-time while they were in school. The numbers for tuition and fees, books and supplies, financial aid, employment rates, and foregone earnings from Table 3 were substituted in the equation, the discount rate used to calculate present values was set at either 5 or 10 percent, and the ability adjustment factor was set at 15 or 25 percent. The earning differentials were either the raw differences found in the Census between high school graduates and those with less than three years of college, or the differences adjusted by a 3.5 percent growth factor.

Table 6 shows the results if different assumptions are made. Column 1 contains the most conservative estimate. For example, the present value of the return on the investment of an average community college student enrolled in the Fall of 1976 is $4,346. This was calculated by subtracting the present value of the costs from the present value of the benefits, using no adjustment for growth, a 25 percent ability factor, and a 10 percent discount rate. At the other end of the table in the last column is the most liberal estimate. The estimate of $17,345 is also the difference of the present value of the costs and benefits but was calculated with a 3.5 percent growth adjustment, a 15 percent ability factor, and a 5 percent discount rate.

In addition, the table shows which assumption made the greatest impact on the results. The biggest break comes between column 4 and column 5 when the discount rate is shifted from 10 to 5 percent. The next factor having the most impact is the adjustment of the ability factor. The difference between the 15 percent and 25 percent rates provides a rough measure of what the results would have been if no ability factor had been used.

These calculations include neither the costs of transportation, nor the costs of foregone leisure time. The person attending college is foregoing leisure

MARYLAND COMMUNITY COLLEGES

HUMAN CAPITAL
PRESENT VALUES OF PRIVATE INVESTMENTS IN COMMUNITY COLLEGE EDUCATION

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
Average student	$ 4,346	$ 5,363	$ 4,634	$ 5,691	$13,855	$16,601	$14,892	$17,345
Male								
Part-time student								
Employed full-time	15,335	17,447	15,890	18,091	34,837	39,537	36,064	40,960
Employed part-time	9,540	11,652	10,095	12,296	28,628	33,328	29,855	34,751
Unemployed	2,547	4,660	3,102	5,303	21,137	25,837	22,363	27,260
Full-time student								
Employed full-time	11,224	12,770	11,632	13,239	29,247	33,182	30,277	34,372
Employed part-time	8,567	10,113	8,974	10,582	26,464	30,398	27,493	31,588
Unemployed	5,361	6,906	5,768	7,375	23,105	27,039	24,134	28,229
Female								
Part-time student								
Employed full-time	1,203	1,449	1,336	1,597	3,429	3,980	3,656	4,231
Employed part-time	-916	-670	-783	-522	1,159	1,710	1,385	1,960
Unemployed	-3,179	-2,851	-3,046	-2,785	-1,266	-715	-1,039	-464
Full-time student								
Employed full-time	1,308	1,543	1,376	1,617	3,473	4,001	3,624	4,165
Employed part-time	-144	91	-76	164	1,952	2,479	2,102	2,643
Unemployed	-1,694	-1,459	-1,626	-1,386	328	856	478	1,019

Column 1 - Earning differentials not adjusted for growth; ability factor, 25 percent; discount rate, 10 percent.
Column 2 - Earning differentials not adjusted for growth; ability factor, 15 percent; discount rate, 10 percent.
Column 3 - Earning differentials adjusted for 3.5 percent growth; ability factor, 25 percent; discount rate, 10 percent.
Column 4 - Earning differentials adjusted for 3.5 percent growth; ability factor, 15 percent; discount rate, 10 percent.
Column 5 - Earning differentials not adjusted for growth; ability factor, 25 percent; discount rate, 5 percent.
Column 6 - Earning differentials not adjusted for growth; ability factor, 15 percent; discount rate, 5 percent.
Column 7 - Earning differentials adjusted for 3.5 percent growth; ability factor, 25 percent; discount rate, 5 percent.
Column 8 - Earning differentials adjusted for 3.5 percent growth; ability factor, 15 percent; discount rate, 5 percent.

time not only while he is in class, but also while he prepares for class. However, the consumptive benefits of college are not added in the equations either. Some students may value their college investment for the learning experience itself. The difficulty of measuring the costs of foregone leisure or the benefits of consumption was the major reason for their exclusion. There is also some indication they may balance out each other. The costs of transportation, however, are real costs to students which should be considered when reviewing the results in Table 6.

The results also are a reflection of current employment estimates. Because of the increased enrollment of women in higher education and the national trend toward increased participation of women in the labor force, the results in Table 6 for women may be significantly underestimated. However, social trends are difficult to gauge, and the use of actual data seems more defensible than the use of estimates. Women who do not drop out of the labor force can expect a rate of return similar to that of men.

What was the internal rate of return for Maryland community college students?

The same equations used to find the present value of the difference between individual costs and benefits are used to determine the internal rates of return for the different categories of students. (See equations.) Instead of selecting a discount rate, such as 5 or 10 percent, a discount rate is computed by giving "PV" a value of zero and solving the equations for "i."

Using this process, it is estimated that the average community college student in Maryland can expect a 26.85 percent return of his or her investment. Table 7 illustrates returns computed for different categories of students based on the conservative assumptions of no growth adjustment, a 25 percent ability factor, and a 10 percent discount rate.

The same limitations that applied to present value results are applicable to the estimates of internal rates of return. The rates for women may seem higher than might be expected from the present value results, but this is due to the lower opportunity costs to women for foregone earnings.

Compared with alternative long-term investments available in the money market today, community college education appears to be a sound investment.

SOCIAL INVESTMENT

The social economic gain from education, the gain to society as opposed to individuals, differs from the private gain in costs and benefits. Social rates of return attempt to measure all costs of education to society as well as the benefits of increased productivity resulting from additional education. The costs include not only the amount the student spends for tuition, fees, books, supplies, and foregone earnings, but also the public payment of subsidies. The benefits of increased productivity are measured by increased earnings. This assumes that earnings reflect an employee's output which is at this time the best indicator available.

TABLE 7

MARYLAND COMMUNITY COLLEGES

HUMAN CAPITAL INTERNAL RATES OF RETURN FOR PRIVATE INVESTMENTS

	Internal Rate of Return
Average student	26.85%
Male	
Part-time student	
Employed full-time	77.5
Employed part-time	18.7
Unemployed	11.3
Full-time student	
Employed full-time	108.5
Employed part-time	23.6
Unemployed	14.9
Female	
Part-time student	
Employed full-time	21.4
Employed part-time	7.2
Unemployed	3.6
Full-time student	
Employed full-time	31.1
Employed part-time	9.2
Unemployed	5.4

The results in this study provide only a limited assessment of the social rate of return. They were derived by adding to private costs subsidies paid by the State of Maryland and the local jurisdictions, including restricted and unrestricted funds. Costs such as depreciation on capital were not included. The benefits to society at large not captured in increased earnings also have not been incorporated into the equations. Some argue that the value to society of an educated populace is far more significant than the earnings differentials indicate.

The people of Maryland are designated as the "society" who make the social investment and receive the benefits. Only a small percentage of students attending Maryland community colleges come from out-of-state, and community college students have a greater tendency to remain in-State than students attending four-year colleges or universities. The *Student Follow-Up Study: First-Time Students Fall 1972* showed that 93 percent of students surveyed in 1976 were employed in Maryland or Washington, D. C. [37] Maryland community colleges also receive their main support from the State, the local subdivisions, and the students themselves. Only a small proportion comes from outside sources.

What are the costs?

Direct costs are obviously greater to society than to students because some of the expenditures are paid out of public subsidies. In this study, restricted and unrestricted expenditures by the State of Maryland and the local subdivisions for FY 1977 were added to student costs. Using these figures, expenditures per credit hour were calculated, and costs assigned to individual students according to their status as full- or part-time. Federal monies were not included although some proportion probably came from Maryland tax dollars.

Table 8 shows estimates of direct costs. The total amount spent by the State, the local jurisdictions, and the students for tuition and fees was divided by the number of credit hours taken in FY 1977 to get an estimate of the cost per hour. The same procedure was used to estimate the cost per credit hour in FY 1978 using budget and enrollment estimates from the colleges. From the Follow-Up Study, it was estimated that students attend Maryland community colleges an average of 33.2 hours. Full-time student cost was found by multiplying 33.2 times the cost per credit hour ($55.50). Cost per part-time student was found by multiplying 16.6 times the FY 1977 cost per credit hour for the first year of the cost stream and then multiplying 16.6 times the FY 1978 cost per credit hour ($60.06) for the second year. (The cost stream for full-time students was only one year.) The other direct cost was for books and supplies purchased by students.

Opportunity costs included the foregone earnings of students which serve as an indicator of lost productivity and tax revenue to Maryland. An opportunity cost that was not included was foregone real estate taxes on property owned by the colleges. From the impact study, the State and local jurisdictions did not realize about $579,000 in real estate taxes. (Although the method used to compute this value probably resulted in an understatement, it is the best estimate available.) The amount of foregone real estate taxes per student proved to be insignificant.

TABLE 8

MARYLAND COMMUNITY COLLEGES
SOCIAL COST FACTORS

Student Status	Age	Foregone Earnings			Years in College	Financial Aid	Credit Hours	Cost Per Hour	Credit Hour Cost	Books and Supplies
		Employed Full-time	Employed Part-time	Unemployed						
Male										
Part-time	27	0	$3,526	$7,781	2	0	16.6[1]	$55.50	$ 921	$150
							16.6[2]	60.06	997	
Full-time	20	0	3,526	7,781	1	$250	33.2	55.50	1,843	300
Female										
Part-time	28	0	3,394	7,014	2	0	16.6[1]	55.50	921	150
							16.6[2]	60.06	997	
Full-time	20	0	3,394	7,014	1	250	33.2	55.50	1,843	300

[1] First year
[2] Second year

What are the benefits?

The primary benefit to society from its investment in higher education is the increased productivity resulting from the increased learning. This is measured by differences in earnings among those with different educational backgrounds. The same factors which affected the earning differentials in the private calculations, such as growth adjustment, ability and employment rates, also affect the social computations.

The other benefit coming to Maryland from outside the State is federal student aid. The amount of federal aid for student grants and scholarships was divided by the number of full-time students to arrive at an estimate for this benefit. The total amount of federal student aid (not including loans) was available from the State Board for Higher Education. [28]

There are other benefits to society that are not captured by simply focusing on earning differentials. For example, higher education appears to make important contributions to the quality of citizens and community responsibility. Another important benefit is the reduced transfer payments, such as welfare and unemployment compensation, which go heavily to the less educated.

Social investment equations:

Part-time students

$$\frac{-SC-BS-e(FG)}{(1+i)^{1}} + \frac{-SC-BS-e(FG)}{(1+i)^{2}} + \frac{(1-a)(e)(ED)}{(1+i)^{3}} + \dots + \frac{(1-a)(e)(ED)}{(1+i)^{n}} = PV$$

Full-time students

$$\frac{-SC-BS-e(FG)+FA}{(1+i)^{1}} + \frac{(L-a)(e)(ED)}{(1+i)^{2}} + \dots + \frac{(1-a)(e)(ED)}{(1+i)^{n}} = PV$$

SC = Social cost, including State and local expenditures and student tuition and fees
BS = Books and supplies
e = Labor force participation rate (employment rate)
FG = Foregone earnings
FA = Financial aid
i = Interest rate
a = Ability adjustment factor
ED = Earning differential between high school graduate and person with less than three years of college
PV = Present value of community college investment

How much more money in present dollars will be earned by Maryland community college students enrolled during the 1976 Fall semester because of the total investment by the State, the local jurisdictions, and the students themselves?

Before aggregate estimates can be made, it is necessary to compute the social returns for individuals. The same method used to compute the private returns is used in calculating the social return. Values are substituted into the equation and the length of the time streams are the same as those used for private return computations. The social return for an average community college student ranged from $3,078 to $16,008, depending on the assumptions made. (See Table 9.) The major factor in the discrepancy between the two figures is again the discount rate change from 10 to 5 percent.

To get an estimate of how much more money in present dollars will be earned by all Maryland community college students, the number of students in the various categories is needed. For example, if more students are in the full-time employed categories as opposed to the unemployed categories, the overall return will be greater because of the costs of foregone earnings. Student data by sex, by full- or part-time status, and by employment status are not readily available. However, six Maryland community colleges, including Catonsville, Montgomery, Prince George's, Dundalk, Allegany, and Anne Arundel, were able to provide this information for the 1976 Fall term students, which made up about 60 percent of the total State enrollment. Using these statistics as guidelines, students enrolled in Fall 1976 were separated into the categories described in Table 10.

By multiplying the number of students in each category times the calculated social return, it is possible to estimate the present value of the total social returns for Maryland community college students enrolled during the Fall 1976 semester. The results, shown in Table 11, range from $334.1 million to $1,333.4 according to the assumptions made. (The student categories also aid in estimating average returns for both social and private investments.)

The actual return to Maryland per se is probably lower than these figures indicate because of the migration of students from the State. As noted earlier, the number of former community college students remaining in the State is very high. Reducing the estimates 10 to 15 percent would allow for any overstatement because of migration.

What was the internal rate of return for the social investment made by the public and the students?

The social return equations are used to compute the social internal rate of return for community college students. Overall, the return for the average community college student is 14.9 percent, which represents a good investment for Maryland society. The Maryland rates of return are comparable to social rates reported in other studies, which ranged from 13.3 percent [33] to 13.7 percent. [45]

The same process used in estimating private internal rates of return was used in determining social internal rates of return. In the equations for social investment, "PV" was given a value of zero, and the equations were solved for

TABLE 9

MARYLAND COMMUNITY COLLEGES

HUMAN CAPITAL
PRESENT VALUES OF SOCIAL RETURNS FOR INDIVIDUALS IN COMMUNITY COLLEGES

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
Average students	$ 3,078	$ 4,105	$ 3,376	$ 4,683	$12,909	$15,265	$13,556	$16,008
Male								
Part-time student								
Employed full-time	14,110	16,222	14,665	18,666	33,525	38,225	34,752	39,648
Employed part-time	8,315	10,427	8,870	11,071	27,316	32,016	28,543	33,439
Unemployed	1,122	3,435	1,877	4,078	19,825	24,525	21,051	25,948
Full-time student								
Employed full-time	9,909	11,455	10,317	11,924	27,869	31,804	28,899	32,994
Employed part-time	7,252	8,798	7,659	9,267	25,086	29,020	26,115	30,210
Unemployed	4,046	5,591	4,453	6,060	21,727	25,661	22,756	26,851
Female								
Part-time student								
Employed full-time	-22	224	111	372	2,117	2,668	2,344	2,919
Employed part-time	-2,141	-1,895	-2,008	-1,747	-153	398	73	648
Unemployed	-4,404	-4,076	-4,271	-4,010	-2,578	-2,027	-2,351	-1,776
Full-time student								
Employed full-time	-7	228	61	302	2,095	2,623	2,246	2,787
Employed part-time	-1,459	-1,224	-1,391	-1,151	574	1,101	723	1,265
Unemployed	-3,009	-2,774	-2,941	-2,701	-1,050	-522	-900	-359

Column 1 - Earning differentials not adjusted for growth; ability factor, 25 percent; discount rate, 10 percent.
Column 2 - Earning differentials not adjusted for growth; ability factor, 15 percent; discount rate, 10 percent.
Column 3 - Earning differentials adjusted for 3.5 percent growth; ability factor, 25 percent; discount rate, 10 percent.
Column 4 - Earning differentials adjusted for 3.5 percent growth; ability factor, 15 percent; discount rate, 10 percent.
Column 5 - Earning differentials not adjusted for growth; ability factor, 25 percent; discount rate, 5 percent.
Column 6 - Earning differentials not adjusted for growth; ability factor, 15 percent; discount rate, 5 percent.
Column 7 - Earning differentials adjusted for 3.5 percent growth; ability factor, 25 percent; discount rate, 5 percent.
Column 8 - Earning differentials adjusted for 3.5 percent growth; ability factor, 15 percent; discount rate, 5 percent.

TABLE 10

MARYLAND COMMUNITY COLLEGES

HUMAN CAPITAL
STUDENT EMPLOYMENT CATEGORIES

	Number Students	
All students		76,877
Male		36,264
Part-time students		
Employed full-time	10,663	
Employed part-time	5,625	
Unemployed	5,080	
Full-time students		
Employed full-time	2,803	
Employed part-time	7,237	
Unemployed	4,856	
Female		40,613
Part-time students		
Employed full-time	13,667	
Employed part-time	7,210	
Unemployed	6,516	
Full-time students		
Employed full-time	2,488	
Employed part-time	6,422	
Unemployed	4,310	

TABLE 11

MARYLAND COMMUNITY COLLEGES

HUMAN CAPITAL
PRESENT VALUE OF SOCIAL RETURNS FOR COMMUNITY COLLEGE STUDENTS

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
Average social return	$ 3,078	$ 4,105	$ 3,376	$ 4,683	$ 12,909	$ 15,265	$ 13,556	$ 16,008
Average social return for men	8,368	10,257	8,873	11,359	26,941	31,326	28,086	32,653
Average social return for women	-1,645	-1,389	-1,533	-1,278	379	923	581	1,145
Present value of all social returns	$236,653,440	$315,578,280	$259,524,870	$360,019,200	$992,415,825	$1,173,516,372	$1,042,150,135	$1,230,681,465

Column 1 - Earning differentials not adjusted for growth; ability factor, 25 percent; discount rate, 10 percent.
Column 2 - Earning differentials not adjusted for growth; ability factor, 15 percent; discount rate, 10 percent.
Column 3 - Earning differentials adjusted for 3.5 percent growth; ability factor, 25 percent; discount rate, 10 percent.
Column 4 - Earning differentials adjusted for 3.5 percent growth; ability factor, 15 percent; discount rate, 10 percent.
Column 5 - Earning differentials not adjusted for growth; ability factor, 25 percent; discount rate, 5 percent.
Column 6 - Earning differentials not adjusted for growth; ability factor, 15 percent; discount rate, 5 percent.
Column 7 - Earning differentials adjusted for 3.5 percent growth; ability factor, 25 percent; discount rate, 5 percent.
Column 8 - Earning differentials adjusted for 3.5 percent growth; ability factor, 15 percent; discount rate, 5 percent.

"i." Table 12 illustrates internal rates of return computed for different categories of students based on the conservative assumptions of no money growth, a 25 percent ability factor, and a 10 percent discount rate. The same limitations that affected the computations of present values, mainly the negative effects of migration, apply to the internal rate of return calculations.

The calculation of the social rates, using both present value and internal rates of return, fails to include external benefits to society at large and nonpecuniary benefits to the individual. Although these benefits are difficult to measure, and therefore omitted from the calculations, some day their significance should be recognized.

ADDED TAX

Another way of looking at social benefits is by estimating the increased tax revenue that can be expected. Tax estimates flow directly from the estimate of income differentials found in the private human capital model by applying marginal tax rates to the income increments. This measures the extent to which the individual who benefits from higher education repays the public subsidies he receives. While this approach does indicate the extent to which individuals repay subsidies through taxes, it provides little insight into the decision making process of allocating current funds to education.

What are the costs?

When considering future tax revenues, often costs are ignored. However, just as foregone income is important to students attending school, foregone tax revenue is important to the public at large. The student who works full- or part-time while he is in college is less costly to society than one who is unemployed, at least from a tax standpoint. Incremental taxes that would have been received by State and local governments were estimated to be 5.6 percent of foregone earnings attributed to individual students, not including any property tax payments. [15]

What are the benefits?

The benefits are the increased taxes students pay on income resulting from their educational investment. The same percentage used in computing foregone taxes (5.6 percent) was multiplied times the earning differentials used in estimating the private investment returns.

What is the present value of the additional State and local tax revenues generated from the increased earnings?

Using the tax equations below, it is estimated that the average student will pay increased taxes of $327 to $1,009 in present dollars. (See Table 13.) The present value of the additional taxes the State and local governments can expect from community college students enrolled in the Fall 1976 term is between $25 million and $77 million, depending on the assumptions made.

TABLE 12

MARYLAND COMMUNITY COLLEGES

HUMAN CAPITAL
INTERNAL RATES OF RETURN
FOR SOCIAL INVESTMENTS

	Internal Rate of Return
Average student	14.9%
Male	
Part-time student	
Employed full-time	40.5
Employed part-time	16.8
Unemployed	10.7
Full-time student	
Employed full-time	45.8
Employed part-time	18.6
Unemployed	13.2
Female	
Part-time student	
Employed full-time	10.0
Employed part-time	4.9
Unemployed	2.4
Full-time student	
Employed full-time	9.8
Employed part-time	5.8
Unemployed	3.8

TABLE 13

MARYLAND COMMUNITY COLLEGES

HUMAN CAPITAL
PRESENT VALUE OF INCREASED TAXES DUE TO COMMUNITY COLLEGE INVESTMENTS

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
Average student	$327	$348	$335	$359	$883	$986	$899	$1,009
Total taxes from all students	$25,172,525	$26,718,520	$25,742,540	$27,620,975	$67,861,702	$75,804,134	$69,115,289	$77,575,117
Male								
Part-time student								
Employed full-time	1,033	1,061	1,043	1,078	2,030	2,290	2,057	2,331
Employed part-time	709	737	719	754	1,682	1,942	1,709	1,983
Unemployed	317	345	327	362	1,263	1,523	1,290	1,564
Full-time student								
Employed full-time	721	748	731	766	1,858	1,941	1,878	1,961
Employed part-time	572	599	582	617	1,702	1,785	1,722	1,805
Unemployed	393	420	408	438	1,531	1,614	1,551	1,634
Female								
Part-time student								
Employed full-time	106	119	111	126	234	262	243	277
Employed part-time	-12	1	-7	8	108	136	117	151
Unemployed	-139	-126	-134	-119	-28	-0-	-19	15
Full-time student								
Employed full-time	97	111	102	117	219	248	229	262
Employed part-time	16	30	21	36	133	162	143	176
Unemployed	-72	-57	-66	-51	43	72	53	86

Column 1 - Earning differentials not adjusted for growth; ability factor, 25 percent; discount rate, 10 percent.
Column 2 - Earning differentials not adjusted for growth; ability factor, 15 percent; discount rate, 10 percent.
Column 3 - Earning differentials adjusted for 3.5 percent growth; ability factor, 25 percent; discount rate, 10 percent.
Column 4 - Earning differentials adjusted for 3.5 percent growth; ability factor, 15 percent; discount rate, 10 percent.
Column 5 - Earning differentials not adjusted for growth; ability factor, 25 percent; discount rate, 5 percent.
Column 6 - Earning differentials not adjusted for growth; ability factor, 15 percent; discount rate, 5 percent.
Column 7 - Earning differentials adjusted for 3.5 percent growth; ability factor, 25 percent; discount rate, 5 percent.
Column 8 - Earning differentials adjusted for 3.5 percent growth; ability factor, 15 percent; discount rate, 5 percent.

To find the total amount of increased taxes the State and local governments can expect, the average tax payment per individual is multiplied by the number of students enrolled during the Fall 1976 semester. State and local governments spent over $68 million for credit students enrolled in community colleges in FY 1977. According to which assumptions are used, the taxpayers may be able to recapture some or all of their expenditures.

Tax equations:

Part-time students

$$\frac{-(t)(e)(FG)}{(1+i)^1} + \frac{-(t)(e)(FG)}{(1+i)^2} + \frac{(t)(1-a)(e)(ED)}{(1+i)^3} + \ldots + \frac{(t)(1-a)(e)(ED)}{(1+i)^n} = PV$$

Full-time students

$$\frac{-(t)(e)(FG)}{(1+i)^1} + \frac{(t)(1-a)(e)(ED)}{(1+i)^2} + \ldots + \frac{(t)(1-a)(e)(ED)}{(1+i)^n} = PV$$

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t = Average percentage of personal income paid in State and local taxes, exclusive of the property tax
e = Labor force participation rate (employment rate)
FG = Foregone earnings
i = Interest rate
a = Ability adjustment factor
ED = Earning differential between high school graduate and person with less than three years of college
PV = Present value of community college investment

PART II: HUMAN CAPITAL INVESTMENT

CONCLUSION

Several other factors should be considered in using these estimates of returns for private and social investments because the returns used in the study are based on average experiences of past students. Use of the results to justify an increase in higher education assumes the additional students will realize rates of return comparable to those of past students. It is possible that returns at the margin may fall far below those found in this study.

This part of the study also does not attempt to measure the economic impact of the growing noncredit programs. This is due primarily to lack of income data for students enrolled in these programs. In the future, it may be important to include these community college programs since the returns on the relatively low-cost, short-term noncredit courses may far exceed those for traditional credit programs.

Finally, the estimates in this study fall far short of an accurate determination of all the social and private benefits that come from investing in community college education. The returns computed, however, imply that for now investment in community colleges is sound economic policy.

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APPENDICES

APPENDIX A

MULTIPLIER EFFECTS

The multiplier effect is an economic gauge of the expansion of dollars injected into a given environment from a single source. The expansion of dollars in circulation is a product of the distribution and partial recovery of the initial investment. The purpose of a multiplier is to reflect in the estimated impact of an initial expenditure the second, third, and higher order effects resulting from the fraction of each initial dollar passing into the hands of local businesses and individuals who respend, partly on local goods and services and partly on items originating outside the area. The final impact of the initial expenditure will be some multiple varying directly in size with the respending fraction and inversely with the amount of leakage from the first spending cycle.

The total gain in local income depends primarily on how much of the respending is absorbed by local suppliers as opposed to the amount that leaks out of the region to business on the outside. The smaller and less self-sufficient the region, the larger the portion of respending that leaks out, and the smaller the multiplier effect of the original investment. The larger the region, the greater is the total cycle of respending recaptured by the region, and the larger the multiplier.[1]

Harrison says, "It can be seen that the decision whether to include secondary and tertiary benefits and costs of a scheme depends entirely on the accounting stance taken . . . the importance of an industrial project is not only in the direct employment of labor or the payment of county and municipal taxes, but also in the employment and expenditure induced by the development."[2]

It should be pointed out that multiplier effects are generated only by exogenous investment or spending that does not withdraw resources from alternative uses in the region. Therefore, education paid for out of local monies will not incur multiplier effects. In the same way, investment in a regional college cannot be valued for its multiplier effect if this educational spending displaces other forms of external investment that would have created as much employment, increases in productivity, higher incomes, and equally larger multiplier effects.

Studies show the range of multipliers for small areas to be from about 1.00 to 1.70, the majority of which are less than 1.20. In larger areas, such as states, the multiplier can be from 2.00 to 3.00, while in the largest of regions, such as the United States, the multiplier reaches a magnitude of about threefold the size of the initial investment. Bish and Brown point out several factors which affect the multiplier:[3]

1. Geographic size of the area

2. Size of the facility work force
3. Diversity in the local economic activity
4. Current growth
5. Forward and backward linkages to industry
6. Payroll leakages
7. Underemployment
8. Excess business capacity
9. Unfilled vacated jobs
10. Increased participation in the labor force
11. Unemployment

A study of the establishment of new manufacturing plants in five rural towns in Kentucky illustrates how these factors can effect the secondary impacts. For example, commuters from outside the impact region had a negative effect on the multiplier. The study equated the total increase in income due to new industry to the community income multiplier times the new industry payroll. The communities, ranging in population from 2,000 to 5,000, had estimated income multipliers of 1.46, 1.73, 1.43, 2.02, and 1.26, which are relatively small because of underutilization of employees.[4]

In a study sponsored by the Economic Development Administration, the multiplier effect was also considered in determining benefits to a community from new industry. Almost 100 case studies were reviewed, encompassing more than 700 manufacturing plants in 245 locations and 34 states. The study found that while industry undeniably brings new jobs to a community, there is some question of who gets the new jobs. Because many of the new employees came from without the impact area or were newcomers to the labor force, primarily women, new industry did little to reduce unemployment and poverty. The employment multiplier effect for a majority of the rural communities was less than 1.2, with the highest at 1.71.[5]

While these studies were concerned only with rural communities, it follows that the same conditions exist for larger areas, although perhaps with less consequences. Similar multiplier effects for larger communities will rarely be greater than those reported above because of leakage factors which affect all areas. For example, the larger the local market area and the more diversified and integrated its economic base, the easier it is to absorb additional local demand from college expenditures with smaller additional requirements for labor and capital. These studies produced figures lower than those generated by regional impact models. Models based on cross-sectional data will usually predict higher impact levels, however, than are found in actual case studies.

In some of the economic impact studies in education,[6] traditional multipliers are not used; instead, coefficients representing local marginal propensities to spend locally are employed. It is clear that these coefficients are intended to include conventional multiplier effects because they are applied to secondary expenditure and employment totals and are based on economic base studies. The total effect of the coefficients in these studies is an average income multiplier effect on expenditures of 1.9 and on employment of 1.5.

Selgas, et al, point to problems in decomposing the multiplier effects. The linkages between the multiplier effect and the coefficients are weak and based on little empirical data. In their study, by using survey data and multiplier literature, they came up with a multiplier of 1.45 for the Harrisburg, Pennsylvania tri-county area.[7]

Both income and employment multipliers then will depend on the size of the impact region, its growth and economic activity, among other things. Because the income and employment multipliers are based on similar data, the same multiplier will be used for both "m" and "j" for college regions. Because there are indications the employment multiplier is not as flexible as the income multiplier due to migration effects, the State employment multiplier will use a more conservative estimate. Multipliers used in this study will probably result in conservative estimates of income-expenditure effects. Suggested multipliers to be applied to the fifteen community college regions in the State are:

College	Impact Region	Projected Population January 1, 1977	m and j
Allegany	Allegany County	82,100	1.2
Anne Arundel	Anne Arundel County	355,300	1.3
Baltimore	Baltimore City	826,200	1.45
Catonsville, Dundalk, Essex	Baltimore County	643,800	1.4
Cecil	Cecil County	56,700	1.2
Charles	Charles County	63,800	1.2
Chesapeake	Kent, Talbot, Caroline, and Queen Anne's Counties	85,900	1.2
Frederick	Frederick County	101,000	1.3
Garrett	Garrett County	24,900	1.2
Hagerstown	Washington County	110,000	1.3
Harford	Harford County	141,200	1.3
Howard	Howard County	108,500	1.3
Montgomery	Montgomery County	585,300	1.3*
Prince George's	Prince George's County	682,400	1.3*
Wor-Wic Tech	Worcester and Wicomico Counties	88,400	1.3
Maryland Community Colleges	State of Maryland	4,170,600	2.0 (m) 1.5 (j)

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GRAVITY THEORY

The factor "EL" represents the proportion of total nonhousing expenditures that an individual is likely to make in his local environment. This factor assumes the gravity theory which states that the amount of money spent for nonhousing expenditures is inversely proportional to the square of the distance to the point of purchase. This is shown in the equation:

$$EL = \frac{\dfrac{DS_L}{D_L{}^2}}{\dfrac{RS_L}{D_L{}^2} + \dfrac{RS_{N1}}{D_{N1}{}^2} + \dfrac{RS_{N2}}{D_{N2}{}^2} + \dfrac{RS_{Nn}}{D_{Nn}{}^2}}$$

RS_L = total period retail sales in the local environment

D_L = average distance or travel time for a local individual to make a purchase within his local environment

RS_{Nn} = total period retail sales in the n^{th} competing neighboring community

D_{Nn} = average distance or travel time for the local individual to make a purchase in the n^{th} competing neighboring community

This assumed proportion is not necessarily universally true, and studies by area or state planning departments should be consulted when available. Period retail sales can be found in the *Retail Trade Area Statistics and Selected Services: Area Statistics*, Census of Business.

MARYLAND BUSINESS VOLUME

Maryland business volume was estimated by first obtaining the sum of the dollar volume of retail, selected services and wholesale sales, and value added by manufacturing in the State. Because the most recent figures available for all these values were for 1972, this sum was weighted by the ratio of 1976 State sales tax receipts to the 1972 receipts to make the figure more representative of current conditions.

1971-72 Maryland Retail Sales[1]	$ 9,480,043,000
1971-72 Maryland Selected Services[1]	2,261,677,000
1971-72 Maryland Wholesale Sales[2]	10,212,246,000
1971-72 Value Added by Maryland Manufacturing[3]	4,697,400,000
Total Maryland Business Volume 1971-72	$26,651,366,000

$$BV_L = \$26{,}651{,}366{,}000 \text{ X } \frac{419{,}412{,}000^{4}}{291{,}981{,}000}$$

$$BV_L = \$26{,}651{,}366{,}000 \text{ X}$$
$$BV_L = \$26{,}651{,}366{,}000 \text{ X } 1.4364$$

$$BV_L = \$38{,}282{,}022{,}100$$

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APPENDIX D

REVIEW OF THE LITERATURE

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INTRODUCTION TO
REVIEW OF THE LITERATURE

The continued growth in college enrollments and in the number of college educated people is an indication that college attendance is and should be a part of the normal educational experience of people in society today. Not only has the demand for college-educated people expanded very rapidly, but at the same time there has developed a widespread belief that higher education offers a significant source of other returns that benefit society at large.[1]

In response to this desire for more universal higher education, the community college segment has seen unprecedented growth in the last 20 years. One of the major reasons for this has been the accessability of community colleges in Maryland and the rest of the United States. By lowering the cost of higher education to students and providing easy geographic access to institutions that substantially reduce the economic cost of higher education, the community colleges have opened the door to higher education to a whole segment of the population which probably would not have been able to obtain any college education otherwise.

The community college segment has already provided many benefits to the population of Maryland, not only in terms of the value of the education provided to the students, but also in terms of the diffusion of higher education institutions and the cultural and social advantages that they offer. While most such benefits are easily identified, the quantification of these benefits is a necessary element in the process of making decisions about the future direction of community colleges. Taxpayers and their legislative representatives at all levels are hard pressed to continue the level of support necessary to finance the expanding costs of education. Evidence justifying the investment in public community colleges should be useful to those who must make decisions about alternative uses of public funds.[2] The community college program has had a considerable impact on individual communities and the state as a whole providing both economic and social-cultural benefits that accrue to individual and society in general.

The economic benefits can be considered according to the types of impacts generated. First and foremost is the investment aspect of education. As a result of education, the employee and his employer can expect more productivity and a higher income than would otherwise be expected. Both society and the individual benefit as a result of the increased productivity and income. As a corollary to higher incomes that college educated persons generally command, they are better able to pay taxes, making a larger contribution to the public revenues. In this way, public support of higher education can pay off in increased future tax revenues which provide a return to the public sector on its investment in education.

Finally, the operation of the community college results in more immediate community benefits by providing increased jobs locally, directly as a part of operating and capital expenditures of the college and indirectly as a result of the spending and respending of the income earned by the employees of the college.

Associated with these benefits are costs. These costs include not only the capital and operating costs of the community college program, but also the opportunity costs associated with the income, tax receipts, and production lost while the student is enrolled in school, and the lost property tax receipts on the property which is removed from the tax rolls. While not all these costs are associated with each benefit, they must be included in the calculation when appropriate.

In addition to the economic benefits there are additional social and cultural benefits that, while part of the college program, also extend to the community by improving the quality of life there. There also are additional benefits associated with higher education which can be classified as improvements to the quality or quantity of human resources in the community. The faculty and staff provide technically trained people who probably would reside elsewhere if the community college were not present, and the students comprise a skilled, low-wage, part-time labor force which otherwise would not be present. Finally, it is to be expected that the staff, faculty, and even the students of the community colleges will have some social impact on the community. Dobesh and Henry point out that there are various social benefits that society receives from the education mission of community colleges. "Foremost among these benefits is the greater understanding of the nature of man, his environment and the society in which the student will function throughout his life."[3] Others have argued against limiting student output as student credit hour aggregations.[4] Hyman et al. in an extensive study found that "education produces large, pervasive, and enduring effects on knowledge and receptivity to knowledge."[5] They go on to say that knowledge is a fundamental purpose of the entire education enterprise, not as simply to increase earning potential.

However, research over the years has proven that education is directly related to increased earnings, and that higher education institutions do impact the communities in which they are located. One way to better understand the economic impacts of education is through cost-benefit analyses. By using this tool it is possible to weigh the benefits against the costs to get a clearer picture of the various impacts. Before looking specifically at the applications of cost-benefit techniques, it is appropriate to review the history and development of cost-benefit analysis.

COST-BENEFIT ANALYSIS

History and Development

Cost-benefit analysis is a technique for making decisions within a framework decided upon in advance and involving a wide range of considerations, many of which have a political or social character. It is not relevant or serviceable for large-size investment decisions that are likely to alter the whole economy.[6] McKean says the purpose of cost-benefit analysis is to help determine both the size of a budget, or the number of projects, as well as the particular projects to be undertaken. The criterion used to indicate the relative merits of different proposals is the ratio of benefits to cost.[7]

The weighing of pros and cons has been around since man appeared on earth. In the United States, formal cost-benefit analysis dates back to the early part of the 19th century when Albert Gallatin and others studied alternatives for canals and turnpikes. Since then techniques have improved as tools to help decision makers economize.[8] Harrison points out that cost-benefit analysis is a method of assessing priorities in investment decisions, especially at the federal level where it has seen the greatest use in water resources management.[9]

For example, as early as 1824 the Navigation-Improvement Act and in 1902 the Reclamation Act provided for surveys and engineering reports to be made for each proposal. The idea that benefits should be measured, and that they should exceed costs in order that a project be justified, became widespread in the thirties.[10] During the fifties, greater use of cost-benefit techniques were used in a variety of agencies at the federal level, and by the sixties were being adopted by states and local governments.

During this time, three techniques were developed to measure costs and benefits. In the Present-Value Rule, a project is adopted when the present value of the associated stream of net benefits or net receipts, discounted at the appropriate rate of interest, is greater than zero. In the Internal-Rate-of-Return Rule, a project is selected if the internal rate of return is greater than the appropriate rate of interest. And finally, in the Annual-Net-Benefits Rule, a project is adopted if the annual net benefits are greater than zero when computed at the appropriate rate of interest.[11]

In determining costs and benefits, there are two kinds of economic effects for any proposed policy, including efficiency, or how much is available; and distribution, or who gets what share. Cost-benefit analyses are primarily concerned with economic feasibility, that the economic value of benefits are greater than the economic value of the costs, to whomever they occur.[12] A cost-benefit analysis, therefore, is concerned with the economy as a whole, with the welfare of a defined society, and not a smaller part of it.[13] Welfare economics, on the other hand, determines if a government expenditure is desirable by analyzing if the program is economically efficient and if the income redistribution effects are desirable.[14]

Blaug says that "in one sense, cost-benefit analysis is an attempt to do explicity what the price mechanism does implicity, namely, to choose investment projects in order of their benefits per unit of costs."[15] It is necessary to be explicit because a whole range of government services are normally supplied without prices being charged for them. Often, there are no prices in terms of which benefits can be evaluated. Cost-benefit analysis then, provides information, much like consumer research. In the public sector the test of survival is often judgment of survival in the political process. But even more importantly, it causes officials and citizens to look at problems of choice in the right ways, even if values must be determined on the basis of judgment. It at least helps to raise the right questions.[16]

Wilkenson defines cost-benefit analysis as a comparative cost study rather than a predictive or descriptive study. He points out that it is also referred to as economic analysis, cost-effectiveness analysis and systems analysis.[17] McKean argues that the different names are used to distinguish among application. The first is used, for example, when economic policies are compared, the second when defense actions are compared, and the third when alternatives include complex, interrelated parts.[18]

Even though economic analysis is imperfect, it can be an effective tool in evaluating public spending policies. Prest and Turvey point out four strengths of the process: 1) It forces quantification of costs and benefits as well as possible to replace vague qualitative judgment or personal hunches; 2) It provides clues to charges consumers are willing to pay; 3) It raises appropriate questions; and 4) It can act as a screening device.[19] Its use in the public sector is also important because it extends the profitability criterion to benefits accrued to individuals who do not bear any or all of the related costs.[20]

The major weakness is that it assumes the classical model of perfect competition being in equilibrium and that market prices reflect opportunity costs of goods and services and are unaffected by the entity under analysis.[21] Others have also noted that noneconomic gains and costs often are ignored. Those factors which cannot be quantified nevertheless must be considered. McKean says that this is the major limitation of cost-benefit analysis, and even when quantification is possible in noneconomic cases, extreme caution must be exercised. "The difficulties are not created by cost-benefit analysis. Moreover, they do not render quantitative analysis useless. They simply mean that one has to be discriminating about when and how to use various tools."[22] The benefit-to-cost ratio is not the only piece of information used in making a decision, but it can play an important role in the final determination.[23]

Problems or Factors to be Considered

A major consideration in cost-benefit analysis is determining the impact region because impacts are exerted at different points in completely different economic spaces. For example, at the national level, a closed system, the external effects balance out throughout the economy. Determination of the impact region, then, becomes important in deciding which indirect, or secondary costs and benefits, should be included. On a national level, only direct costs and benefits are considered, since including indirect costs would result in duplication or double counting. Assessing regional impact must include all costs and benefits since the expected external effect can assume greater importance.[24] Prest and Turvey add that because numerous types of benefits and many different beneficiaries makes double counting possible, a limited purpose makes development easier.[25]

McKean notes that primary benefits are often defined as the amount that people would pay for the output of a project.[26] Government agencies also have conceived primary benefits as the value of goods and services that stem from a project. (But by doing this the error of double counting can be compounded.) Secondary benefits are the values added over and above the value of the immediate projects or services of the project as a result of activities stemming from or induced by the project.[27] McKean warns against the use of secondary benefits: "If they are genuine gains to the economy, why is it that private firms are not encouraged to take them into account?"[28] As far as economic efficiency is concerned, these transfers are irrelevant, though they are important to the distribution of wealth.

A similar concept that enlarges on the definitions of primary and secondary benefits is the difference between pecuniary and technological effects. Technological effects, like primary benefits, represent real loss or gain to society. Pecuniary effects, on the other hand, offer no change in real productive possibilities, but effect changes in relative prices, which only redistribute goods and services among people.[29] This is applicable to a closed economic system, such as the United States or even Maryland where secondary or pecuniary effects reflect only shifts in relative demand patterns and cannot be counted as real benefits.

The decision of whether to include secondary or tertiary benefits and costs depends on the accounting region entirely. In a county impact region, for example, local multiplier effects can be extremely important, especially if the impetus is created from without.[30] In a closed system, multiplier effects, reflecting secondary gains, are almost inappropriate:

> Every expenditure project may be regarded as adding to total demand and thereby to income and employment if it is assumed that the level of total expenditures on all other things in the economy would be the same whether or not that project were undertaken. However, if it is assumed that the alternative to one project is some other one, then the income and employment effects are not an appropriate criterion for decision making . . . If the alternative were not another government project but a tax reduction, this would permit an increase in private expenditures.[31]

At the county level, however, the spending by the state, for example, for community college education represents spending that might not otherwise have occurred. Therefore, determining the degree to which respending occurs is important to understanding the full impact of the project on the community. Harrison points out that the impact may also be felt by other nearby areas, especially by industries importing materials. It is possible that the impact to the area of a project's location could be minimal if inputs are imported and value is added primarily to capital as opposed to labor. Another factor which lessens the impact is the extent to which the ownership is outside the locality. Therefore, in addition to focusing on absolute size, it is necessary to look at the linkage patterns expected.[32] Several methods have been developed to measure potential multiplier effects and predict linkage patterns.

The economic base study identifies key economic activities of a community. It begins by defining the community, and then by dividing the local economy into segments, including firms and individuals serving markets outside the community and those servicing markets within the community. Base studies deal with the demand side of the economy, or where the products are sold, as well as the supply side. To determine local consumption, a multiplier process is used, taking into account increase in export plus local investment income and the propensity to consume locally. Several factors affect the propensity of consumers to spend locally, including community size, geographic location, and income. The larger and more isolated the community, the greater the local income generated per dollar of local sales.[33]

Another framework for summarizing the economic activities of a region, is the input-output matrix. The matrix sums the flow from each industry and household to every other household and industry. This is done by comparing and contrasting employment in different industries and service areas. Because an employment base is used, the input-output matrix is most useful in understanding short-run impacts. The multiplier, then, is a short-run concept that takes time to work out to its full effects.[34]

McKean points out that most of the increases in income constitute secondary benefits occurring in the region in which the project is located. So far as this region is concerned, a project ordinarily gives rise to a net expansion. It may even appear to provide an increase to the system as a whole because the inputs are released through a long chain of adjustments and from widely dispersed operations. Estimates of secondary benefits can give a somewhat accurate picture of local expansion but are inadmissable in viewing the larger system.[35]

The size of the region selected for study also raises the problem of measuring costs and benefits of effects not internalized. It is difficult to measure when markets are uneconomical and the size of external costs and benefits are uncertain. The question arises if the cost-benefit valuation should be adjusted to allow for external impacts. That can depend on the cost of acquiring information and the value of the information.[36] Prest and Turvey argue that externalities should be accounted for if they alter physical production possibilities or the satisfactions that consumers get from given resources. They should not be considered if the only effect is price of products or factors.[37]

Mishan says that spillovers must be internalized by transforming the incidental by-product into a joint product. However, he acknowledges that many important environmental spillovers cannot be internalized because a market can never be created for them. That is one of the major reasons the cost-benefit method is required to evaluate them. He adds that a cost benefit analysis cannot ignore any spillover effects, positive or negative, that are of social concern. "The economist gives an estimate based on independent economic principles; not as a rationale for the political process."[38]

There are other factors not directly associated with region size that also must be considered in a cost-benefit analysis. One of these is dealing with benefits or costs which have no implicit market price. This problem was discussed earlier as a weakness of the cost-benefit technique.

Costs and benefits which cannot be quantified or priced are often called intangible, while those that can be priced are called tangible. Weisbrod says "what is tangible or intangible, measurable or nonmeasurable, is less than a matter of what is abstractly possible than it is of what is pragmatically, and at reasonable cost, feasible."[39]

The term shadow price is used specifically to cover the worth of intangible social benefits or losses that are either unpriced by the market or unsatisfactorily priced in general. The question of valuation depends on the relevant political constraints.[40]

Choices about government expenditures, says McKean, are group choices for which there is no ultimately correct preference function. Government is guided by a complex mixture of rules, constraints and discretionary authority. Because of the uncertainties it is difficult to determine values of alternative outcomes. The role of prices, according to McKean, is to serve as appropriate substitution ratios among inputs, intermediate outputs, and end-items in the whole sequence of choices.[41]

Markets provide an enormous amount of information at a relatively low cost, even though the information is still short of being perfect. Imperfect markets pose problems in cost-benefit analyses because using substitute prices to account for imperfections can sometimes distort the final product. In addition, in a mixed economy observed market prices do not indicate necessarily the appropriate substitution ratios. Shadow prices can be determined by using computer programming techniques, comparing similar market prices, or determining prices implied by other government choices. Estimates of shadow prices for certain nonmarketed items would not command sufficient agreement to be worthwhile. McKean suggests, "For many of these nonmarketed effects I see no better procedure than to leave the shadow price to the political process."[42]

Another factor that has a misleading effect on shadow prices and cost-benefit analyses as a whole is unemployment. For example, it complicates prediction problems and interaction effects--if no project is undertaken, private investment may be reduced. Unemployment may also be overestimated as a free resource; often projects stimulate inflation more than reduce inflation.[43]

Excess supply at the current market price of any input overstates the social cost of using that input. If there is general unemployment, expenditures on a project, by creating a multiplier effect, will create additional real incomes in the rest of the economy. This causes overstatement of social costs and underestimation of total benefits.[44]

McKean argues against correcting employment costs for an excess of the market price because:

> 1) If correction is made for project costs only, the relative social costs of project labor and of other inputs may be more purely estabilished than if no correction at all is made; 2) Correcting future costs requires establishing future unemployment, which is difficult to do; and 3) Impact depends not only on the expenditure itself, but also upon the way it is financed.[45]

Another factor which can affect the final outcome of a cost-benefit analysis even more significantly than unemployment is selection of the interest or discount rate. The computation of present value requires using a discount rate to discount future income streams in ways that reflect the fact that future dollars have less value than present dollars. By making this adjustment, decision makers can compare income benefits on the basis of the present value.

The selection of the discount rate can be difficult. Some researchers consider the rate of return on long-term federal bonds to be the appropriate rate to be applied to public investment decisions. Others use the internal rate of return on the next best alternative investment. The selection of low discount rates will favor investments whose benefits are long-range, such as education. Webb suggests that lower discount rates can be used for public investment decisions as opposed to private decisions since society has an interest in future as well as present generations.[46]

In an equilibrium, a single rate of interest could be used because the social rate of time preference and social rate of return of investment would coincide.[47] However, if other factors are known to affect equilibrium, such as risk, a higher discount rate may be needed.

Because each of the factors or problems discussed above adds confusion or uncertainty to the process, it is important to consider sensitivity testing. The final product will have more validity if the calculations of the most crucial elements of the problem are repeated under a number of different assumptions.[48] McKean suggests that careful attention be given to devising alternative courses of action to be compared. "Sound models and criteria will not result in picking out good policies if only poor ones are considered."[49]

MEASURING COSTS AND BENEFITS IN EDUCATION

Controversies surround the application of cost-benefit analysis to public investment decisions concerning education. Discrepancies arise from the determination of the relevant costs and benefits. Critics point out that an economic study does not include the more intangible externalities, such as increased opportunities or the transmission of cultural heritage. The difficulties associated with subjective evaluations do not need to preclude the application of the cost-benefit analysis tool to education. The application does not negate indirect costs and benefits. But the technique can make it possible for education investment decisions to be evaluated similarly to other public investment projects, as well as provide education with comparative data for accountability purposes. "Cost-benefit analysis releases education from reliance on the non-quantifiable data that has limited the presentation of its case in the past."[50]

Wilkenson notes that the costing techniques are built on a base of present cost data and therefore depend on the ability to describe "true" costs. However, education does not know how to precisely describe its output or the costs to produce this output. Many studies seek or claim to describe the costs of education, but they lose all meaning for anything but a specific application to a specific institution or are too general to be of any real use.[51]

However, Blaug argues that education falls uneasily between cost-benefit analysis and cost-effectiveness analysis. "Educational institutions, whether public or private, in one sense do 'sell' their output of services in a market, the labor market, with the difference that payments accrue to the owners of the services and not to the producing units."[52] Therefore, the earnings of educated people can be used as prices to evaluate the output of education. Blaug goes on to say that "since education everywhere serves multiple goals, only one of which is strictly vocational, both cost-benefit analysis and cost-effectiveness analysis are appropriate techniques for evaluating education projects."[53] It should be pointed that many educators deny that the pursuits of education should be controlled by economic determinism. Career patterns are not always selected to maximize income and the pursuit of education is not necessarily geared to profit.[54]

Although the cost-benefit technique is not in high regard by some economists as an investment tool, its use and application as an education planning tool has been well established. There also is a need to compromise between simplicity and complexity. Trade-offs favor simplicity whenever distortion of results can be held to a minimum.[55]

Two economic models are often used in estimating the economic benefits and costs of higher education. The human capital models are used to estimate the benefits flowing from the effects of education in terms of the productivity of workers and the economic costs of providing that education. The economic impact analyses estimate the impacts on communities derived from the operation of higher education institutions.

Human Capital Investments

Viewed as an economic investment in skills, college training has been highly profitable to individuals and society, and an integral part of the American dream of success and the good life. Steps were taken in the fifties and sixties to make college a reality for millions. The number of college students tripled, and employment in higher education reached more than either the automobile or steel industries.[56]

Education is one way that people invest in themselves. By paying some costs in the present, they can generate greater returns in the future. "But if the phrase 'education is investment' is to be more than a metaphor, it ought to be possible to calculate rates of return on transforming present into future income via educational investment."[57] In order to determine if it is a profitable investment compared to alternative investment options, it is necessary to compare the known stream of costs of education with the expected stream of future earnings. That amounts to a cost-benefit analysis, treating the purchase of education as analogous to the purchasing of any capital asset.[58] This particular kind of cost-benefit analysis is usually referred to as human capital investment.

As the term human capital implies, individuals have certain capacities or skills of a cognitive, physical, social, or psychological nature with which they earn a living. Higher education, for example, is capable of teaching a person general facts, the use of specific tools, and general problem-solving techniques. It also can influence a person's behavior by making him more tolerant of diversity, better able to stand stress, often a better leader, and mentally more disciplined. "All these aspects of cognitive and affective behavior could make a person a more productive and effective worker."[59]

Intensive interest in the proposition that education is an investment in human beings originated with Theodore Schultz in 1960. Since then there has been considerable study and much controversy about how education and earnings are causally linked. One view is that schooling develops skills and cognitive abilities beyond the levels normally achieved through on-the-job training, making the school-trained person more productive and able to command a higher salary. Others argue that native ability and family background are more important, with schooling contributing only a relatively small increment to productivity. Finally, a third school of thought holds that a successful academic career serves primarily as a screening device for employers, and that the schooling contributes little to an employee's productivity.[60]

Webb points out that there is no question about the value of a literate, educated citizenry which is necessary for the functioning of a democratic state. But there is some uncertainty as to the value of additional years of schooling, such as community college preparation. She says the primary economic benefit of education to society that justifiably can be quantified includes increased national income associated with education, increased tax revenues generated from the increased income, and the category of negative benefits associated with education, which are gains from reduced demands for social services, such as welfare costs and costs connected with crime that are attributable to inadequate education.[61]

While all these views have some validity, the relevant issue for this discussion is the process of determining whether or not higher incomes are associated with additional years of schooling. Establishing the specifics of a causal relationship between education and income continue to dominate the writing in human capital investment.

> Obviously, factors such as intelligence, race, religion, personal contacts, personal appearance, physical ability, family background personality, wealth, chance opportunities, institutional prestige, and the demand and supply relationships of the various occupational specialities are all variables which are causally related to income. Additional variables such as work related experiences, quality of education, and the intensity of the schooling investment have been emphasized recently. An interesting change in the tone of the literature is that the questions are no longer directed toward the validity of the human capital concept but are now concerned with how to determine its value.[62]

Although there is some evidence to suggest that many individuals over-invest in schooling,[63] there is ample evidence that there are earnings differentials among the population which are correlated with education.[64] Becker's classic study showed that all the estimates indicate a very substantial private gain to white male college graduates.[65] (It should be remembered that these estimates are essentially averages and not marginal rates of return; they do not answer the question, should there be more or less investment in education.[66]) While there may be some doubt as to whether education is a sufficient condition for obtaining a higher paying job, it does appear to be a necessary catalyst, at least for the majority of the population.

> In other words, we are assuming that people acquire extra education only when the job opportunities and the associated lifetime income stream that it is expected to create outweigh the value of the time and resources that will have to be invested, due allowance being made for the fact that income foregone in the present is worth more than equivalent income accruing in the future . . . as if they were equalizing rates of return on all possible investment options available to them.[67]

The economics of education first became a legitimate source of economic inquiry in T. W. Schultz's presidential address to the American Economic Association in 1960 in which he observed that human capital investment is an important aspect of economic development. Until then, the concept of human capital had been ignored for the most part.[68] Schultz's theory grew out of his observation that advances in technology could not explain all of the gains in productivity. In his search he "began to see the role of the acquired abilities of human agents as a major source of the unexplained gains in productivity."[69] These abilities were not free, meaning that scarce resources were being allocated to acquire them.

Schultz noted the omission of human capital in the economic growth models that dominated the economic literature. This did not mean that human capital was completely ignored. Several distinguished economists had looked upon humans as capital, such as Adam Smith, H. von Thunen, and Irving Fisher. Alfred

Marshall alluded to this idea in his dictum that: "Knowledge is our most powerful engine of production."[70] Schultz advocates an investment approach as a necessity for thinking about economic growth. In this way, the stock of capital is augmented by investment, and the productive services of the additional capital increase income, which is the essence of economic growth. This is applied to the three traditional elements of production: labor, capital, and land.

In the past decade there have been important advances in economic thinking with respect to investment in human capital. This set of investments is usually thought of in terms of schooling and higher education, on-the-job training, migration, health, and economic information. Most of the work has been concentrated on the first of this set.[71] March also suggests that economic literature has continued to make physical investment the principal factor in economic growth and to minimize or disregard the economic contribution of education in human resources.[72]

At the outset Schultz found dealing with land and labor manageable, but capital to be analytically elusive. As he went further into the problem, he concluded that whether or not an economy is in equilibrium, or whether its technology is changing or constant, there is a capital structure that consists of more than one form of capital. Traditional economists ignoring this factor did not come to grips with capital theory. Schultz calls it a disaster, the major weakness of classical theory.[73]

Economists have known a long time that people are an important part of the wealth of nations. But what they have not examined is the simple truth that people invest in themselves and that these investments are very large. One reason for this is that values and beliefs cannot see human beings as capital goods, except in slavery. To treat humans as wealth that can be augmented by investment runs counted to long-held values. However, many paradoxes about a dynamic economy can be resolved once human investment is taken into account. For example, national income often increases faster than national resources. Income in the U. S. has been increasing at a much higher rate than the combined amount of land, man-hours worked, and the stock of capital used to produce the income. One explanation is the large improvement in the quality of inputs that have occurred, but have been omitted from the input estimates.[74]

This brings up the problem of how to establish the magnitude of human investment. Schultz says it is possible to use the practice followed in connection with physical capital goods by estimating the magnitude of capital formation by expenditures made to produce capital goods. In human capital, one problem is immediate: how to distinguish between expenditures for current consumption and those for capital formation. This then becomes a major task of anyone investigating human capital investment.[75]

Today human resources are seen by some to be the true basis for the wealth of nations as opposed to capital, income, and material resources. They argue that realistically the wealth of nations should be measured by some quantification of human resources using indices reflecting minimization of population growth and improvement of the environment.[76]

Investment in people makes it possible to create and adapt to technological progress. The benefits of education, for example, can be categorized as 1) increases in production through income in the capacity of the labor force; 2) increases in efficiency by reducing unnecessary costs and by reserving resources for the enhancement of human productivity; and 3) increases in the social consciousness of the community so that living conditions are made better. To quantify the impact of human capital in areas such as education still remains an enigma. Three approaches have been used.

First, a simple correlation is often made between some measure of educational activity and an index of economic activity. For example, enrollment ratios have been correlated with GNP per capital, indicating a positive relationship. However, this fails to show cause and effect relationships.

Second, the residual approach assesses the total increase in the economic output of a country for a period of time, measuring the impact of identifiable inputs and then attributing the residual to unidentifiable inputs, the most important of which is human capital. Although the data show substantial variations in the residual, economists agree that investment in education has a vital effect on the economic growth. However, the residual is difficult to circumscribe because of the interplay between capital inputs and education.

The third approach (the rate of return method) contrasts the future lifetime earnings of people of less education with people of greater education attainment. This often follows the cost-benefit analysis whereby the costs associated with education are estimated and deducted from the benefits, leaving an estimate of the economic value of education. Alexander believes that the rate-of-return method above is the most precise because it not only analyzes economic benefits but also relates costs thereto.[77]

Rates of return are simple ways to describe the value of a college education. To calculate a rate of return, it is necessary to know how much an education costs, how much the college educated earn compared to those without a college education, and how much those future earnings are worth today.[78] In the following section, problems or factors which must be taken into account in determining costs and benefits will be discussed.

The costs of education can be divided into two categories. First, there are the direct costs incurred by direct expenditures for salaries, supplies, capital outlays, etc. Then there are the indirect or opportunity costs that take the form of foregone student income, foregone tax revenues, etc.[79] Hansen and Weisbrod say, "the real cost of higher education is the loss of the goods and services, or leisure, that must be given up to provide the fact that resource inputs are used in higher education."[80] Costs also have been referred to as explicit, those costs which are in the form of a payment either in cash or in kind, or implicit, those costs in the form of a lost opportunity to use one's resources, including time, in another way.[81]

In addition to the direct costs listed by Webb, Becker includes tuition, fees, books, supplies, and unusual transportation and lodging expenses.[82] Hansen and Weisbrod note, however, that the total cost of attending college is far in excess of any student charges. They go on to say that the fraction of total costs borne by students and their families is far greater than the fraction borne by taxpayers through state and local tax support.[83]

The main factor in the total cost of education is the opportunity cost. Mishan says the opportunity cost of any factor is the highest market value which can be produced in any enterprise that can make use of it currently.[84] In this case, the primary opportunity cost is foregone earnings.

> Since obtaining college education requires the student to be present in school, one form of cost of higher education is--from the student's point of view--the income that he could have earned were he to work full-time rather than attend school; and from society's point of view, that foregone income reflects output that is (at least temporarily) not produced, by virtue of the potential labor resource having been withdrawn from the labor market.[85]

It is true that the foregone earnings cost is not out-of-pocket, but it does impose a financial sacrifice, particularly on low income families. Becker notes that foregone earnings often are a neglected cost of investment in human capital and should be treated as indirect outlays. This includes the difference between what could have been earned and what actually is earned, as well as any value placed on foregone leisure. The amount foregone also depends both on the number of hours spent at school work and the opportunities for part-time and seasonal work.[86] Hudson agrees that from an economic standpoint, the question of income foregone is particularly significant. He notes that the loss is recaptured in the long-run by the greater productivity of graduates, but there are two major qualifications that he suggests regions take into account. First, future benefits have to be discounted, and the benefit-cost ratio is very sensitive to alternative assumptions about the proper social discount rate. Second, the assumption that present incomes foregone in the community will be locally repaid by higher future incomes depends on the willingness of graduates to stay in the region.[87]

Witmer says opportunity costs of higher education seem to include foregone wages and the property taxes real estate would yield were it not devoted to a tax-free enterprise.

> On the other hand, the income taxes students would contribute were they fully employed, the income taxes professors would contribute were they employed at salary levels typical of alternate employment open to them, contributions of college and university spending to the local economy, the exemption of higher education institutions from corporate income taxes, and other forgotten costs are usually ignored.[88]

There has been some controversy about including foregone income as a cost component. Schultz, Cohn, Blaug, and others feel that it should be included and that a downward bias in the estimate of education costs will be created if it is excluded. On the other hand, others have not included it because to do so without including income foregone by housewives or voluntary workers or benefits received while being educated would open the gate to approximations which would take the concept of national income away from its origin as an estimation of the measurable flow of the economy. Webb suggests this latter rationale seems to be applicable to a consideration of the deletion of foregone income in the cost-benefit framework which is concerned with substantive quantitative data rather than vague approximations.[89]

Schultz argues that earnings foregone by students are well over half of the real costs of the human capital formation of higher education. He expresses concern that these costs are often omitted in the planning and financing approach to higher education. By not including the opportunity costs in the planning stage, they are effectively concealed.[90] Becker claims the dominance of foregone earnings and the relative unimportance of tuition can be vividly demonstrated with rate of return calculations. "Good economic reasons, as well as lack of information and motivation, may prevent poorer high school graduates from attending even tuition-free colleges."[91]

Given that education is a necessary catalyst to reach higher income levels, measuring the difference in the average income of people with different levels of education provides an estimate of the value of education. A 1972 study by the Census Bureau estimates that a college graduate earns $331,685 more during a lifetime than a high school graduate.[92] Kastner found the direct returns to individuals who acquire a community college education represent an annually compounded interest rate of at least 5.6 percent for males and 5.88 percent for females.[93]

Alexander points out that the economic value of education is distorted by factors, such as intelligence, parent's education, sex, race, etc. Researchers disagree with some finding education to be a substantial contributor to higher economic returns while others find it to be far less significant. The value of education is never negated, but an element of uncertainty is introduced which cannot be accounted for.[94]

Weisbrod and Karpoff agree that variables other than educational attainment also contribute to the observed differentials in average earnings. One such variable is innate ability. They argue that the need to control for student ability is clearly critical to avoid attributing to schooling the effects of other variables which are likely to be positively correlated with level of education.[95]

The income differences between educational categories, according to Raymond and Sesnowitz, are likely to overstate the effect which education has on income since those with more income are more apt to have greater ability. Much work has been done recently in an attempt to separate the effects of education and ability on earnings, but no clear consensus has been reached. Empirical work is hampered by a lack of data, by the interaction between the explanatory variables, and by the absence of a measure of ability independent of education. Greater ability and motivation and higher socioeconomic status are all positively correlated with educational attainment and with each other. Compounding the difficulty is the absence of a variable which incorporates both quantity and quality of education.[96]

A study by Hause indicates that the net opportunity costs of people of high ability who acquire one or more college degrees relative to the actual earnings profiles of high ability people leaving school after high school graduation is not significant. Therefore, he found that the overstatement of rates of return to a college education due to an understatement of ability-related opportunity costs not to be a serious source of bias.[97] In his early studies, Griliches used a measure of ability in determining the long term returns for educational investment. He now feels that adding an ability bias was somewhat misdirected. "There is no good reason to expect the 'relative ability bias' to be constant across different samples or to generalize easily from one study to another and to the population at large."[98]

Becker points out that economists have been aware that conventional measures of ability, while relevant at times, do not reliably measure the talents required to succeed in the economic sphere. At least since Pigou, economists have tried to reconcile the skewness in the distribution of earnings and other income with a presumed symmetrical distribution of abilities. However, their arguments do not directly help explain the skewness in earnings.[99]

Becker goes on to say that "the true rate of return on education is grossly overestimatedbecause persons differing in education also differ in many characteristics that cause their incomes to differ systematically.[100] He further suggests that the available quantitative materials definitely show a positive relation between education and several measures of ability. But even after adjustment for differential ability, his studies show the private rate of return to white male college graduates to be considerable.[101] Using the Becker studies, Hansen and Weisbrod in their research of rates of return to California college graduates corrected final earnings differentials by 25 percent.[102] To account for ability differentials, Raymond and Sesnowitz reduced the income differentials between all education categories by both 15 and 25 percent.[103] Webb chose to deflate the estimate of a gross income differential by 33 percent to account for the posited ability factor.[104] Finally, in a study designed to determine the ability factor, Weisbrod and Karpoff estimated that about one fourth of the difference shown by census data between the mean earnings of college graduates and the mean earnings of high school graduates can be viewed as a return of the higher level of non-educational variables possessed by college graduates generally.[105]

Another factor that in recent years has been as significant as ability is the change in demand. During most of this century, more jobs have been offered to college trained workers than there were graduates available to fill them. Demand for well-educated persons has risen since the thirties because of a shift in government and business toward complicated military hardware and systematic research. On the other hand, Becker says a growth in the relative number of highly educated persons would reduce rates of return on education.

> For the earnings of college and high school graduates would decline relative to less-educated persons, and thus absolute earning differentials between college and high school graduates would decline even if percentage differentials were unchanged. And a decline in absolute differentials would lower the rate of return from college unless costs declined by an equal amount.[106]

Miller found no significant deterioration in the relative value of education through 1960:

> The large relative increase in the supply of college-trained workers did not adversely affect their relative income position. On this basis it is concluded that the demand for more highly educated workers has kept pace with the increased supply of such workers and, as a result, their relative income position has not changed.[107]

A later study by Miller also produced evidence of an enhancement of the value of education.[108] Raymond and Sesnowitz also reported that after making a number of revisions in the methodology employed by previous investigators, their results indicated that the increased supply of college-educated people during the 1960's did not cause a significant reduction in the rates of return on a college education.[109]

Several economists estimated the rate of return for college students who graduated before 1970 to be between 10 and 12 percent. Baxter, however, suggests that those who graduated after 1970 may receive lower returns. He describes the college labor market in the early 1970's as "an over-enthusiastic celebrant on New Year's Day: it was hurting."

> Throughout most of this century, more jobs were available for college graduates than there were college graduates who wanted them. In the 70's, the opposite has been true. College graduates looking for work in the 1970's were caught in a three-way squeeze: more people were graduating than in the 60's, a larger percentage of the graduates

> wanted to go to work rather than continue their schooling and large numbers of students who had attended college in the 1960's completed their postgraduate training. As a result of the surplus many college graduates were hired at salaries that did not keep pace with inflation, some could find no job at all and others were unable to find a job usually given to college graduates.[110]

Freeman also notes the high rate of return from the 30's through the 60's. But he points out that times changed, and in the mid-70's newspapers began reporting that graduates were having difficulty in getting college-level jobs. He raises the question about the significance of the downturn in the labor market for college-educated people in the 70's. Freeman demonstrates statistically that the major decline in the college market in the 70's breaks sharply with previous historical patterns and severely impacts new entrants into the labor market. The new reality for graduates of the 70's, he says, is "falling salaries, scarce job opportunities, and dwindling career prospects."[111]

Several factors begin to explain the sharp decline in the labor market for college-educated workers. On the demand side, the relative position of the highly educated was maintained in the 50's and 60's by large increases in demand due to changes in the industrial mix of jobs, the growth of research and development, and the huge expansion of the educational sector. In the 70's, all of these forces weakened or actually declined in comparison to the rest of the economy. On the supply side, there was little net increase in the number of new college graduates seeking work during the period of rapid growth and demand. Freeman estimates that the rate of return for the class of '73 could be as low as 7.5 percent, still a better return than most savings banks, but a lower return than that offered by some investments.[112]

The Carnegie Commission suggests that even if college graduates experience an average rate of return of 14 percent for the investment in higher education, which is highly unlikely, about a third of them will do less well financially than the most successful third of high school graduates. Not all the occupations that pay well require a college education, and not all the occupations that attract college graduates pay well. Electricians and police officers earn more than teachers, librarians, and registered nurses.[113]

Long payoff periods also effect the rate of return on a college education. Some researchers have noted that the effects of education on income levels may not be immediately felt when the college trained individual enters the work force.[114] If the full value of an education is not reflected in earnings until some years after entering the labor force, this will require some adjustments in the projection of the future earnings curve.

Becker notes that the long payoff period increases the difficulty of anticipating the gain from college. While business investments often pay off within five or ten years, the payoff from college takes much longer. He estimates that the unadjusted rate of return to a 1949 graduate is about 13 percent; yet 10 years after graduation it would still be negative and after a full 15 years only about 6 percent. A long payoff period increases risk along with low correlations between return by reducing the value of information available when investing.[115]

Closely associated with this are life cycle characteristics which also affect the rate of return. Becker's studies show that incomes tend to be relatively low at the beginning of labor force participation, rise throughout later ages until a common peak is reached in the 45 to 54 age class, and decline in the last age class. Most investments in human capital raise observed earnings at older ages, because returns are part of earnings then, and lower them at younger ages, because costs are deducted from earnings at that time.[116] This is significant because the differences at older ages are not as important as those at younger ages due to the discounting procedure.

Becker also suggests that data should be corrected for mortality, growth, and taxation. A decrease in mortality would by itself, he argues, increase rates of return. However, he also notes that mortality among white adults is already so low that subsequent decreases could only increase rates slightly.[117] Raymond and Sesnowitz, on the other hand, argue that mortality adjustment has virtually no impact on the rates of return.[118] Another factor is what effect additional education has on the probability that an individual will be on the unemployment and welfare rolls. According to a U. S. Department of Labor study, 22 percent of the white male high school graduates aged 16 to 26 in 1968 experienced at least one spell of unemployment between 1966 and 1968. Only 6 percent of the college graduates had experienced any unemployment. In October 1972, however, the unemployment rate for recent college graduates stood at 11.7 percent, according to the Department of Labor, while the rate for high school graduates in the same age group was 7.7. These high unemployment rates should not be confused with the unemployment rates for all college graduates. In March 1972, the unemployment rate for college graduates was 3.1 percent, while the rate for high school graduates was 5.6.[119]

Alexander says that even though the value of education as it relates to work has been in question, its value for employment is readily apparent. The more educated person in the job market receives preferential treatment from employers. Whether this is justified is somewhat irrelevant if the market place responds in this manner. Employees seem to feel that the educated worker has favorable external effects on other workers and on the firm in general. It may be possible that too much education may be inefficient to both the individual and the state. However, the employer apparently still seeks to improve his future productivity by hiring more capable workers. Though rates of return to education have declined during the first half of the century and leveled off, education, income, and employment still seem to be positively related and interdependent.[120] There are additional issues which will require some consideration. From a community's standpoint, migration results in a loss of human capital, but migration represents no loss from the individual's standpoint because he takes his human capital with him.[121] Griliches also suggests that wage rates per hour or week should be used in calculating rates of return because annual earnings confound market transactions with issues of labor-leisure choice and the more transitory effects of unemployment. Even that does not completely solve the problem. Jobs differ in fringe benefits, in conditions of work and in opportunities for training and advancement.[122]

Despite the apparent drawbacks to calculating rates of return of college education, valid estimates can be made when the factors discussed above are taken into account.

The social economic gain from education, the gain to society as opposed to individuals, differs from the private gain in costs and benefits. Total social costs, similarly to private costs, include both direct and indirect costs. Direct costs are obviously greater to society than to students because some of the expenditures on students are paid out of public and private subsidies. Low-cost state and local colleges use scarce resources and are not free to society. Indirect costs are greater to society only if the output of students foregone by society exceed the earnings foregone by students, which has been proven untrue. Direct social costs then are the sum of educational expenditures by colleges and the social cost of books and additional living expenses.

Both social and private economic returns from college would differ if a college education had different effects on earnings and productivity. A student usually is most interested in determining the effect of a college education on his earnings. However, society needs to determine education's effect on national income. Becker argues that social returns are larger than private returns because of the external economics produced by college educated people.[123]

Raymond and Sesnowitz have estimated social rates of return by adding to costs all subsidies, including capital costs, and removing the effect of taxes from both the benefit streams and the opportunity costs. They point out that the list of benefits to society at-large produced by higher education was not incorporated into the results. Their findings show that in all cases the social rates fall short of the corresponding private rates. "The extra taxes paid by students after they leave school do not, therefore, offset the sum of the subsidies they receive and the taxes they avoid while in school when all amounts are discounted by the private internal rate of return."[124]

Hansen calculates social costs from 1) school costs incurred by society, i.e., salaries, supplies, interest, and depreciation on capital; 2) opportunity costs incurred by individuals, mainly income foregone during school attendance; and 3) incidental college-related costs incurred by individuals, such as books and travel.[125] Devore and Scott point out a distinct difference between benefits accruing to individuals and the benefits accruing to society. The individual benefits come from personal factors, such as social prestige and job satisfaction as well as the more objective factor of salary. Societal benefits can be more objectively measured since they relate to productivity increases.[126]

Another way of looking at societal benefits is by estimating the benefits in the form of future tax returns. These will flow directly from the estimates of income differentials found in the individual human capital model by applying marginal tax rates to the income increments and to the taxable components of imputed increments to wealth (i.e., property taxes) which are attributable to the additional years of schooling. This will provide a way to consider the extent to which the individual beneficiaries of higher education repay the public subsidies they receive. A difficulty with this approach is that while it may indicate the extent to which individuals pay their subsidy via taxes, it provides little insight into the decision-making process of allocating current funds to education.[127]

The calculation of the social rates by either method fails to include both external benefits accruing to society at large and nonpecuniary benefits accruing to the individual. Although the omitted items are difficult to measure, "there is no reason to believe that they will always be insignificant."[128] Hansen and Weisbrod argue that society receives several significant benefits from its investment in higher education. For example, higher education appears to make important contributions to the quality of citizen and community responsibility. It also provides access to a range of options and opportunities that might otherwise be closed off to certain people. In addition, the aggregate result of increased education may narrow the gulf in understanding between population groups. Another important benefit is the reduced transfer payments for welfare, unemployment compensation, etc., which go heavily to the less educated. To the extent that these effects are positive and sizable, the rationale for public subsidies for higher education is strengthened.[129]

In addition to the problems discussed above, there are factors which should be considered in calculating either a private or social rate of return on human capital. Preston and Turvey point out, for example, the problems of using a current cross-section analysis to preduct a future time series. They also ask if incomes reflect marginal productivity sufficiently well to be used as a measure of social returns.[130] Renshaw points to indirect evidence that people with more education work longer hours and have a tendency to work harder once they get into the labor force. He argues that the method of estimating rates of return imputes to education many other factors of production which are positively correlated with formal education.[131] Raymond and Sesnowitz agree that the value placed upon a college degree in the job market is not solely a function of the increased productivity possessed by college-educated people. The college education, they say, may serve partially as an inexpensive screening device for employers. Thus, some portion of the higher income does not reflect higher productivity, but rather an artificial restriction in the supply of labor. This portion for the income differential, then, is a transfer payment instead of a social benefit.[132]

Miller also has found that estimates based on cohort analyses produce different results compared to those based on cross-section surveys. His studies show that the use of income averages by age based on the cross-section surveys produce lower values than would be obtained by the use of averages based on successive censuses.[133] Weisbrod and Karpoff have even questioned the use of average returns. They point out that average returns mask variation in returns because of the different quality of the college education.[134]

Becker, in addition, has dealt with a series of factors which can effect the rate of return. For example, dropouts earn relatively little more than high school graduates but costs are also less for dropouts. His studies show rates that are far from negligible and that indicate that some college is by no means an economic waste. He also notes that absolute income differentials between college and high school graduates are substantially less for nonwhites than for whites. However, nonwhites do not necessarily gain less from college since both direct and indirect costs are much lower. Similarly, absolute income differentials are much smaller for female than male college graduates, but the rate of return may not be smaller because direct costs are somewhat lower and opportunity costs are much lower for women. The same comparison can also be made between rural and urban persons.[135]

Finally, some education is purchased for consumption rather than investment reasons. In addition, not all the benefits of education accrue to the educated individual alone; therefore, in calculating the yield of investment in education, the investment component must be isolated, the non-educational items eliminated, and the private benefits distinguished from the social ones.[136]

Raymond and Sesnowitz conclude that even the lowest rate of return exceeds the return which could be earned on alternatives that are generally available to the individual.[137] Weisbrod and Hansen, on the other hand, argue that higher education is a good deal less valuable than is commonly believed.[138]

These differing opinions on the rate of return should be considered within the framework of Schultz's concept of capital as entities that have the economic property of rendering future service of some value. The distinctive characteristic of human capital is that it is a part of man, and it is capital because it is a source of future satisfaction, or of future earnings, or both. It is not a negotiable asset in the sense that it can be sold. It cannot be acquired as an asset purchased in a market but by investing in oneself. Therefore, no person can be separated from the human capital he possesses. Schultz says that although education "is in some measure a consumption activity rendering satisfaction to the person at the time he obtains an education, it is predominantly an investment activity undertaken for the purpose of acquiring capabilities that render future satisfactions or that enhance future earnings."[139]

Economic benefits found by rate-of-return analyses, or any other economic tool currently in use, fall far short of an accurate determination of social and private benefits accrued from investing in education. Education, however, still possesses formidable economic benefits, implying that investing greater sums in the development of human capital through education is sound economic policy.[140]

Economic Impact Analyses

The economic impact of colleges can be looked on in long-range terms that suggest the economic worth of educated individuals, or by examining the immediate effect of the income and expenditures of an institution on the economy of an area.[141] College and university faculties and students often dislike being reminded that the organization of which they are a part is an economic entity, substantially concerned with obtaining and utilizing economic resources. In the process of getting and spending, colleges have a choice, according to Millett: to behave as an economic endeavor producing and selling services or to behave as a body politic obtaining resources from taxation and distributing these resources as some particular power structure may determine.[142]

Funds enter the economy through the college from both internal and external sources. Internal sources include state and local appropriations and other funds from state and local treasuries. External funds include outside grants, contracts, and other out-of-state funds from sources such as the federal government and benefactors. Funds are also received from the community through student fees and tuition and general community support. The funds are circulated through the economy by expenditures of the college for salaries, purchase of materials, and capital building improvement. It is through this circulation of funds that the college generates its economic impact.[143]

Caffrey and Isaacs say that the main question an impact study attempts to answer is: "Does the cost of having a college or university nearby or in the community's midst outweigh the revenue gained thereby?"[144] Lyall and Stough, in their study of the impact of The Johns Hopkins University in Baltimore cited two purposes for the study:

> 1) To reveal to the local community the ways and extent to which one of its major not-for-profit institutions contributes substantially to the local economic base, and 2) to

> reveal to the University points at which certain of its activities, perhaps thought to be purely internal matters, affect the community in direct and measurable ways.[145]

A study of the Harrisburg Area Community College also attempted to clarify significant aspects of the economic relationships between the college and the local community and to present quantitative information regarding such relationships.[146] Most researchers have concluded that no single figure tells the story or answers all the questions. There are many kinds of economic impacts, and they cannot simply be added up to one meaningful red or black sum.

The economic impact analysis is actually a series of linear cash-flow formulas which include only what can be readily counted. The models attempt to identify who is spending, how much is spent, what is being bought, and where spending is being done. They do not show political, social, or aesthetic impacts or the effects upon the community of the college's human resources. They do measure dollar outlay and provide simple indicators for planning.[147]

It also should be noted that there is a short-run and long-run economic impact. The product of education, which is most relevant to educators, may have the greatest economic impact in the long-run.

> On the other hand, the expenditures related to a college are usually most relevant on a short-run basis unless there is a long-term building plan and/or expansion in enrollments. In sum, the product appears most relevant on the long-run and the expenditures on the short-run.[148]

Most of the effects considered in an economic impact analyses are current and short range. They are not concerned with the ultimate impact of the college upon the community, and they do not consider what a community might have been like without the college. Applicable policy questions might be, for example, whether to expand college service or whether to rent or buy property.[149] Hudson points out that backward linkages of expenditures, therefore, represent a very considerable potential impact of the college on the local region. "That is particularly so in the short run, because a college's provision of jobs has immediate effects on income whereas the income-generating effects of knowledge and human capital formation are stretched out in smaller amounts over the full lifetime of these resources."[150]

One of the problems associated with economic impact analyses is determination of the multiplier effect. In the general discussion of cost-benefit analysis, the multiplier was discussed, especially as it relates to region size. The purpose of a multiplier is to reflect in the estimated impact of an initial expenditure the second, third, and higher order effects resulting from the fraction of each initial dollar passing into the hands of local businesses and individuals who respend, partly on local goods and services and partly on items originating outside the area. The final impact of the initial expenditure will be some multiple varying directly in size with the respending fraction and inversely with the amount of leakage from the first spending cycle.[151] The multiplier is developed through an analysis of the consumer-business-consumer recycling process, which is associated with that increase in income, with due allowance made for the passage of time usually taken for convenience to be one year.[152]

The total gain in local income depends primarily on how much of the respending is absorbed by local suppliers as opposed to the amount that leaks out of the region to business on the outside. The smaller and less self-sufficient the region, the larger the portion of respending that leaks out and the smaller the multiplier effect of the original investment. The larger the region, the greater is the total cycle of respending recaptured by the region, and the larger the multiplier. It should be pointed out that multiplier effects are generated only by exogenous investment or spending that does not withdraw resources from alternative uses in the region. Therefore, education paid for out of local monies will not incur multiplier effects. In the same way, investment in a regional college cannot be valued for its multiplier effects if this educational respending displaces other forms of external investment that would have created as much employment, increases in productivity, higher incomes, and equally large multiplier effects.[153]

Models developed by Caffrey and Isaacs employ four coefficients which are described as multipliers, although they are actually local marginal or average propensities to spend locally. The coefficients were intended to include conventional multiplier effects by virtue of being applied to secondary expenditure totals.[154] A similar study of the Harrisburg Area Community College impacts found the 1.9 multiplier derived by Caffrey and Isaacs to be too high. Based on data from the local economy, Harrisburg researchers came up with a figure of 1.45.[155] Moore and Sufrin, using an inter-regional trade multiplier based on the minimum requirements approach of economic base analysis, calculated an increase in income of $2.38 for every dollar spent.[156] Ullman and Dacey found the minimum requirements method could be used to separate approximately basic or export activities from non-basic or internal activities. Using this method resulted in internal or service ratios of 1.5 for San Francisco and 1.4 for St. Louis.[157]

The results of studies employing techniques of economic impact analysis have generally found that nonprofit, nontaxed institutions have a capacity to generate employment and millions of dollars in personal income through what is in effect interregional trade. In addition, the subsequent expenditure of that income in the local economy can make an important contribution to economic growth.[158] The findings of a study of Virginia community colleges demonstrated that higher education institutions give more to the communities than they take: The business volume generated by the presence of the community college system exceeded the state's appropriations for the system by 142 percent for the eight-year period of the study.[159] The study also pointed out that economic growth is an expected return of education investment. Virginia's investment in higher education increased almost 200 percent between 1963 and 1973 with the community colleges accounting for a significant proportion of that increase.[160]

The economic impact study at the Harrisburg Area Community College was analyzed in two parts, the impact on business and the impact on local government. In the former, after accounting for the negative impact of taxes, the operation of the college contributed from $2 to $4.5 million annually to the cash flow of the local economy. (The total operating budget of the college was $3.8 million for the year on which the estimate was based.) Although it is difficult to determine a college's total impact on local government, the net impact will usually be positive. One factor that affected a positive impact was that almost 50 percent of the revenues for the college's operating budget came from nonlocal sources.[161]

The Johns Hopkins University, though nonprofit, was found to rival a number of Baltimore's major local businesses in total volume of local business expenditures. Total direct and indirect expenditures attributable to the Hopkins in 1972-73 were more than $137 million. in addition, although the University operates under tax-exempt status, it is still responsible either directly or indirectly for sizable cash payments to Baltimore. However, it was not surprising to find that a tax-exempt institution, many of whose outputs are supplied free to the community, receives more in services from the city than it contributes in taxes. The tax-exempt status perhaps recognizes contributions of those unpaid services to the community.[162]

A similar study at the University of Rhode Island indicates that the institution has both positive and negative economic impacts on the local area and state. The results further indicate that the impacts are substantial. For example, it generates about $81 million of business in the state and $31 million in the local area.[163] Another study of higher education institutions in North Dakota found that for each dollar the state appropriated to higher education, the colleges and universities returned $2.10 to the economy of North Dakota, and that total college-related spending provided the state with 10,000 additional jobs.[164] Gamber's study shows that St. Cloud State University continues to be a major source of income for the St. Cloud, Minnesota area economy. It estimates that university-related spending in the St. Cloud area in 1975 amounted to more than $27 million with an ultimate effect on the St. Cloud area economy of nearly $59 million.[165] A report concerned with the contribution which education as an industry makes to the economy of Western Maryland shows that education had a net impact on the economy of $62 million during the 1975-76 fiscal year.[166]

From these studies, it is apparent that by its presence the college can generate a considerable dollar volume of spending, it can create jobs, and it can add stability.[167] What the studies neglect to say, however, is anything about the side effects, such as noise, congestion, cultural benefits, or attraction of residents and industry to the area. In addition, they do not compare the college with other primary industries in the area. Communities questioning the burdens of a college may prefer manufacturing, retirement communities, tourist business, or other industry.[168]

However:

> Measuring a college's economic accountability is useful primarily when doing so provides a frame of reference in which to evaluate the college on other more important criteria. For example, if a college has a sizable negative impact on its local economy, its presence may not be justified, even if it places all of its graduates in local industry. On the other hand, if a college has tremendous positive impact on the local economy . . . the community may accept a situation in which 90 percent of

> the graduates go outside the local area or even outside the state for employment.[169]

Dobesh and Henry also point out several economic benefits to the understanding of the immediate economic impacts of higher education. First, the study can improve community-institution relations by revealing the inter-relationships the area and college share. Local political leaders can be made more aware of the tax burden and tax revenue benefits that the college generates. Faculty and staff can be made more aware of their immediate contribution to the community and state. And finally state political leaders and and the general state population can see that the outlay of funds in support of higher education does not disappear; rather, the schools return to the economy more than the state invests.[170]

Distribution Effects

Society, says Weisbrod, to make intelligent expenditure decision, needs to be involved not only on the allocative efficiency of its expenditures, but also on the distributive effects which constitute another dimension of a project's impact. Others say that pecuniary effects can be dealt with separately in the real world by overcoming unwanted side effects through taxes and subsidies. He points out, however, that redistributive sums are not additive to real income.[171]

Recognition of possible external effects from higher education is very important because of its implications of the costs that should be borne by students and their parents, and costs that should be borne by the public.

> Society's efforts to cope with policy for financing higher education have been stop-gap in nature--with no resolution of the basic issue as to who should pay. The provision of public funds has been influenced by the customary view that higher education is a good thing, so that whatever resources are required should be provided within reason. Increasingly however, people are inquiring as to the nature and magnitude of the benefits provided by higher education.[172]

Economists often tend to answer questions dealing with efficiency, while actual decisions reflect answers to distribution questions. "As a result, economists are often disappointed that their advice carries little weight, and decision makers are disappointed that economists do not provide more complete advice."[173] Weisbrod suggests that economists supplement estimates of the total costs and benefits of a project with indications of how those totals are divided among the population. Mishan agrees there is more to showing a positive cost-benefit analysis; it is also necessary that the resulting distributions are not regressive and no gross inequities are perpetrated.[174]

Schultz suggests that the expansion of education and the additional earnings from this form of human capital have probably been a major factor in changing the distribution of personal income. The difference in the capacity of individuals to benefit from investment in education probably remains unchanged for the population as a whole, but the distribution of this capacity of those attending college changes as the proportion of people of particular age classes attending college increases. He goes on to say that although higher education appears to be far from neutral in its effects on the distribution of personal income, very little is really known about these effects.[175]

Hansen and Weisbrod argue that the total costs as well as students' costs are not closely related to family income. Therefore, the level of costs poses a substantially greater financial barrier to low income students. Their studies in California also indicate that the current method of financing public higher education leads to a sizable redistribution of income from lower to higher income.

> The paradox of the situation is that those who benefit most from the public higher education system are, in general, those least in need of help in paying for what they receive. But by virtue of the structure of California state and local taxes and the long-standing policy of below-cost pricing,

> there is presently no effective device for shifting more of the financial costs of higher education from those who benefit little or are least able to pay to those who derive the most direct monetary benefits or who are most able to pay.[176]

(Pechman and Sharkansky emphasize that the final work as to the redistributional effect of all government programs cannot be written on the basis of a study of any one public service.[177]) In a similar study in New Jersey, results indicate that income is redistributed from those families with incomes between $5,000 and $15,000 to families earning above $15,000 and below $5,000.[178]

Freeman also explores the notion that public spending on higher education redistributes income from poor to wealthy individuals and families. He argues that there is no serious case for subsidizing higher education to obtain social benefits. He postulates that subsidizing education is no great step towards more equal income distribution.[179]

CONCLUSION

Even though there are flaws in cost-benefit analysis, "to think systematically about the costs and gain from alternative policies is surely more sensible than to rely on haphazard thought or intuition."[188] In addition, when there is a wide disagreement, it is a good framework to organize evidence and intuition.

Local citizens too often only see the college as a loss of tax revenues and extra costs and nuisances. On the other hand, the academic officials are inclined to dwell on economic, cultural, and recreation contributions and the visibility an institution brings a community. Both arguments are not worth very much until the facts and figures are known.[189]

However, colleges are not banks; they do not propose to make money for investors. They do try to enlarge a student's world, to add new people, new pleasures, and new ideas. Careful addition, in short, allows the determination of the costs of a college education, but even the most accurate estimates and projections of economic impacts, salaries, fringe benefits, and employment levels cannot reveal its total value.[190]

FOOTNOTES

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